CHAPTER 22

First Aid and Preventive Safety Training: The Case for an Integrated Approach

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INTRODUCTION

An increasing awareness of the poor performance of the construction industry with regards to occupational health and safety (OHS) and welfare has focused attention on the importance of health and safety training for construction operatives. OHS training seeks to achieve two objectives. The first is to improve individuals’ awareness, knowledge, attitudes and skills in relation to health and safety and the second is to effect positive behaviour change (Cox and Tait, 1998). Simply put, the aim of training is to alter permanently, the behaviour of employees in a way which will further the achievement of organisational goals, such as improved OHS performance. However, the paths leading from training to improved performance in OHS are neither direct nor automatic (DeJoy, 1994). Vojtecky and Schmitz (1986) highlight the need for the systematic evaluation of training a programme’s effectiveness in bringing about a desired outcome. This evaluation should cover two interrelated outcomes of the training programme:

- how effective was the training approach in delivering the necessary learning? and
- how has the training impacted on the performance of the organisation in terms of achieving its strategic objectives? (Loosemore, et al., 2003).

The focus of traditional OHS training has been on providing workers with the knowledge, skills and abilities to do their job safely. However, Goldstein (1993) has observed a low correlation between learning an ability to do something and actual job behaviour. With regard to OHS, this low correlation has been explained by the moderating effect of motivational factors (Lindell, 1994). An important element in the effectiveness of a training programme is the extent to which learning is transferred from training interventions into the workplace. This directly relates to the ability of training to impact upon organisational performance and thereby fulfill the second objective cited above. Holton (1996) developed a theoretical model of factors affecting the transfer of training to the workplace. An adaptation of Holton’s model is depicted in Figure 22.1. According to Holton, there are three distinct outcomes of a training programme. These are: learning;
individual performance; and organisational performance. Assuming that learning occurs, the transfer of learning is determined by three factors: motivation to transfer; the transfer climate; and transfer design.

![Diagram of the transfer model](image)

**Figure 22.1** A theoretical model of factors affecting the transfer of training to the workplace

*Source: Adapted from Holton’s model*

Motivation to transfer is influenced by employees’ expectations of the benefits to be gained from the transfer of learning, for example a reduction in the likelihood of an injury. Holton identifies transfer design as a cause of employees’ failure to transfer learning to the workplace. This refers to the possibility that intellectual learning may occur but trainees are not provided with the opportunity to practice the training in the work context or not be taught how to transfer this learning. Finally Holton’s model suggests that offering a suitable transfer climate is an important determinant of transfer. The importance of organisational environment was highlighted in a recent study by Tracey, et al. (2001) who report that supervisor, job and organisational supportiveness was significantly related to employees’ training motivation. Thus, on completion of a training course, trainees will return to the workplace and respond to cues in the environment. Cues that remind trainees of their training can facilitate transfer of that learning. Also, when the learning is put into practice it should be reinforced with praise or positive feedback to ensure that the desired behaviour is maintained. It is important to note that cues and feedback can emanate from supervisors or managers and that conflicting cues could prevent the successful transfer of training outcomes. For example, the motivational effects of incentive schemes that reward fast production may counterbalance the benefits of an OHS training programme. Holton’s model used to predict training outcomes seems to offer valid explanations as to why some training programmes do not achieve the desired results (Donovan, Hannigan and Crowe 2001).
22.1 PSYCHOLOGICAL MODELS OF ACCIDENT CAUSATION

Workers’ ability to perceive and recognise OHS risks is understood to be essential in the prevention of workplace accidents. However, psychological models of accident occurrence also postulate that, assuming that injury avoidance requires that humans are able to recognise warning signs and avoidance mechanisms, that they make a decision to avoid a danger and have the physiological ability to avoid the danger. For example, Surry’s (1974) decision model of danger build-up and release, depicted in Figure 22.2, is based on a series of questions which detail the human response process to danger. Thus, risk-taking behaviour will still occur, even in situations where humans recognise an imminent danger or the immediate risk of an injury when they fail to make the decision action to avoid the danger in the build-up phase or attempt to avoid the injury in the danger release stage. Human responses at the ‘decision to avoid’ stage are to a large degree determined by their level of safety motivation.

22.1.1 OHS motivation

Motivation has been defined as the arousal, direction and persistence of behaviour (Steers and Porter, 1991). Safety motivation can therefore be defined as the arousal, direction and persistence of behaviour that reduces the likelihood of injury or illness. According to contemporary motivation theories, intended behaviour, effort or choice are the primary mechanisms for explaining behaviour (Vroom, 1964; Ajzen, 1988). These models generally agree that an individual’s behaviour is influenced by beliefs about behaviour-outcome contingencies. The problem with safety motivation is that accidents are infrequent and many occupational illnesses have long latency periods. Thus, direct personal experience of negative OHS consequences is rare. In the absence of immediate and certain punishments (pain and suffering arising from injury or illness) workers’ beliefs about behaviour-outcome contingencies tend not to have a strong motivational effect upon OHS behaviour. Furthermore, information provided in OHS training can be undercut by personal experience. Workers may hold the view that ‘I’ve done it this way for twenty years and never had an accident yet’ or observe other workers who do not follow safety procedures with no apparent adverse consequences. Research also shows that repeated experience of unsafe behaviour without an injury or illness leads to systematic desensitisation and diminished fear (Job, 1990).

22.1.2 First-aid training

Previous research suggests that first-aid training has a positive motivational effect on workers’ OHS performance. For example, first-aid training has been linked to lower incidences of work-related injury (Miller and Agnew, 1973; McKenna and Halc, 1981) and people trained in first aid have expressed a greater willingness to
take personal responsibility for safety and a willingness to adopt safe behaviour (McKenna and Hale, 1982). These findings suggest that first-aid training may have a positive preventive effect, over and above meeting the traditional objective of providing laypersons with the skills to manage the consequences of incidents once they have happened. If this is the case, there could be value in providing first-aid training to all employees in a workplace, rather than to a limited number of designated ‘first aiders’. The research reported in this chapter sought to explore the motivational effect of first aid training on workers’ OHS behaviour in the Australian construction industry.

Figure 22.2 Decision model of danger build-up and occurrence here>
22.2 THE STUDY

An experiment, lasting twenty-four weeks, was conducted on Australian construction sites. Participants' subjective understandings of OHS risks, options for risk control and motivation to control OHS risks were explored during in-depth interviews before and after receipt of a first-aid training intervention. In addition to the interview data collection, objective measurement of participants' safety performance was conducted before and after participants received first-aid training.

22.2.1 Small business

The focus of the study was on construction industry small businesses. The majority of Australian construction firms are small businesses with 97% of general construction businesses employing less than 20 employees and 85% employing less than five employees (ABS, 1998). Research suggests that Australian small businesses do not manage OHS risk as effectively as larger businesses in the industry (Holmes, 1995) and may be unaware of their responsibilities under OHS law (Maybew, 1995). Recent research shows that small business construction industry participants understand risk in terms of factors internal to workers, such as a lack of knowledge or carelessness (Holmes, et al., 1999), and conceptualise risk control as a matter for the individual rather than the firm (Lingard and Holmes, 2000). These factors present difficulties for the prevention of occupational injuries and disease and may explain the higher incidence of occupational injury in small construction firms (McVittie, Barikin and Brocklebank, 1997).

22.2.2 The intervention

All participants attended a generic emergency first-aid training course. This course provides the knowledge and skills to enable participants to provide initial assistance or treatment to a casualty in the event of an injury or sudden illness before the arrival of specialist medical assistance. The course contained both theoretical and practical components, both of which were examined at course completion. Skills taught included the performance of cardio-pulmonary resuscitation and appropriate treatment for fractures and wounds, including bandaging. The course did not contain any information specific to the construction industry. Nor did it contain any information about occupational health and safety risks or their prevention. Training was held off-site at training venues and participants attended the training outside normal work hours. Training course content was standard but participants were able to select which course they attended from among a list of pre-scheduled courses. Thus participants could opt to attend a course close to their worksite on the evenings of their choice. Training courses were all 21 hours long and were delivered over a period of three and a half weeks or seven weeks, depending on whether participants opted to attend once or twice each week. Training courses were delivered by professional employees of
St John Ambulance Australia, one of the largest providers of first aid training in Australia. Trainers were not involved in data collection, which was undertaken by researchers.

22.2.3 The sample

A purposeful, typical case sampling strategy was used to recruit the study participants. The sampling strategy involved the use of key informants to identify what was typical of a small business construction firm, followed by the selection of a small homogeneous sample to describe this sub-group. A set of criteria for typical construction industry small businesses was developed through consultation with an employer organisation (the Master Builders Association of Victoria) and an employees' organisation (the Construction, Forestry, Mining and Energy Union). These criteria included:

- Long-term involvement in the industry.
- Undertaking of a range of work.
- Self-owned/managed or family-owned and run.
- Consistent operators in the industry; and
- Employment of between three and ten people.

Businesses that matched these criteria were then identified and 25 participants from 14 different construction industry small businesses were recruited. The maximum number of participants from any one firm was four. Two participants were builders whose three subordinates also participated in the study. Three participants were subsequently withdrawn from the study, leaving a total of 22. Two participants were withdrawn because they failed to complete the first-aid training courses into which they enrolled and a third was withdrawn because his occupation rendered him unsuitable. This participant was a farm manager, employed by a small business to oversee the construction of a large stable complex. The age of participants ranged from 19 to 52 years with an average age of 31.2 years. The number of years that the participants had spent in the construction industry ranged between three months and 34 years. The average number of years in the industry was 13.9.

The sample was made up of representatives from several different construction trades. The most commonly represented trade was carpentry with nine of the participants being carpenters by trade and two being apprentice carpenters. However, two carpenters indicated they have a supervisory role in their present jobs and another indicated he was primarily a demolition worker. Supervisory roles were also represented with three participants describing their job as being a builder or site manager and one participant being a site foreman. Three plumbers participated in the study. One participant was a roof tiler and one participant was a
landscape gardener. The landscape gardener's apprentice also took part in the study.

22.2.4 Hypotheses

All participants received a standard first-aid training course, the content of which is solely devoted to techniques for the immediate management of injuries and acute illnesses when they occur. This course does not contain any information about construction site risks or their control. Thus, participants received no information that would directly assist them to recognise hazards in their work environment or understand ways in which injuries or illness could be prevented in this context. Thus, in terms of Surry's model, it was expected that first-aid training would not change participants' ability to perceive or recognise workplace hazards. Neither was it expected that first aid training would change their recognition of appropriate avoidance action or ability to avoid a hazard. Thus hypotheses one and two were formulated as follows:

- First-aid training does not improve participants' understanding of acute and delayed effect OHS risks relevant to their workplaces; and
- First-aid training does not improve participants' understanding of OHS risk control for known OHS risks.

However, previous research findings have demonstrated a link between first aid training and an enhanced willingness to take personal responsibility in the avoidance of occupational injury. In the light of the lack of direct preventive information in the first-aid course content, one explanation for this effect is that first-aid training has a positive effect on participants' safety motivation. Thus, in terms of Surry's model, first-aid training changes participants' cognitive response at the 'decision to avoid' stage, making them more likely to decide to avoid a potentially dangerous situation. Subject to their level of pre-existing knowledge of workplace hazards and appropriate risk control responses, this change in decision-making will lead to enhanced OHS behaviour. Thus, hypotheses three and four were formulated as follows:

- First-aid training increases participants' motivation to control known OHS risks; and
- First-aid training improves participants' risk control (safety) behaviour in relation to known OHS risks.

22.2.5 Experimental design

A single-case experiment design was used (Barlow and Hersen, 1984). The design, was organised into two phases and first-aid training was introduced to participants at different timings. The advantage of this experiment design is that it controls bias
in the selection of participants with different characteristics in control and experimental groups, since comparisons are made within subjects and not between them. Single-case experiment designs overcome the difficulties of achieving random assignment of subjects into control and experimental groups in real workplace settings (Komaki and Jensen, 1986). Non-random assignment of subjects into control and experimental groups has been a methodological flaw in previous experiments to assess the effect of first-aid training on OHS awareness and performance (see for example McKenna and Hale (1982)).

22.2.6 Data collection

Objective safety performance was measured by a researcher directly observing workers on site once before and once after they received the first-aid training. Two behaviour rating scales were developed for the direct observation of behaviour (Sarvela and McDermott, 1993). First, a literature review was conducted to identify the historical experience of OHS incidents in the small business construction industry context. Secondly, objective OHS performance indicators were identified for pertinent categories of performance. These indicators were then expressed as measurable items in a behaviour rating scale and observers were trained in their content. Items were rated proportionally as proportional rating scales have been found to yield high levels of inter-rater reliability in previous OHS intervention studies (Ouff, et al., 1994; Lingard, 1995).

Researchers rated the general level of safety on each site using a Global Safety Measure (GSM) and the safety performance of individual participants using an Individual Safety Measure (ISM). The GSM contained 21 items measuring four different categories of safety performance. These were site ‘Housekeeping’ (6 items), use of ‘Personal Protective Equipment’ (6 items), ‘Use of Tools’ (3 items) and ‘Access to Heights’ (6 items). The ISM contained 14 items measuring four different categories of safety performance. These were use of ‘Personal Protective Equipment’ (6 items), ‘Use of Tools’ (3 items), ‘Manual Handling’ (1 item) and ‘Access to Heights’ (4 items).

Inter-rater reliability was assessed three times during the study. This involved two researchers visiting the site and independently measuring safety performance. The percentage agreement between the two raters on items scored and observed was 89%, which constitutes an acceptably high level of inter-rater reliability.

A structured interview theme list was developed to elicit information about participants’ cognition (knowledge) of chronic and acute effect OHS risks, the options available for the control of these OHS risks and issues in emergency preparedness. A structured approach was suited to the research purpose in that it is useful in ensuring the comparability of data and enabled the identification of similarities and differences between participants’ understandings before and after their receipt of first-aid training.
Interviewers were trained in the use of prompts and probes to reduce the problem of over-simplistic responses to interview items. Interviews were conducted in the workplace, during the course of a normal work day, and were tape-recorded for later transcription and analysis.

22.2.7 Data analysis

Pre-training and post-training scores for each category of safety performance measured during the on-site observation of OHS behaviour, were analysed using Paired Samples T-tests. These tests were carried out for both individual safety performance (ISM) and global safety performance (GSM) measurements. Paired Samples T-tests are well-suited to analysing experiment data in which the same person is observed before and after an intervention (Norusis, 1998).

The interview transcripts were double coded independently by two different researchers for major themes and analysed in more depth using ethnographic content analysis (Tesch, 1990). Double coding of data was undertaken to ensure reliability of the coding framework developed. The coding was an iterative process during which the two independent coders reached agreement on the thematic content of data. The importance of emergent concepts for participants’ risk awareness, understanding of risk control, risk-taking tendencies and emergency preparedness was determined on the basis of the frequency with which they were mentioned.

22.3 RESULTS

Key themes that emerged from the pre-training and post-training interview data are presented in Table 22.1.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Pre-training</th>
<th>Post training</th>
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<tbody>
<tr>
<td>OHS risk perception and recognition</td>
<td>Immediate effect OHS risks (falls, power tools, trenches)</td>
<td>Acute effect OHS risks (falls, power tools, trenches)</td>
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<td></td>
<td>Fatal consequences, permanent damage, dread</td>
<td>Fatal consequences, permanent damage, dread</td>
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<td></td>
<td>Dred</td>
<td>Infectious diseases</td>
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<tr>
<td>OHS risk sources</td>
<td>Carelessness or complacency (other workers)</td>
<td>Carelessness or complacency (other workers and self)</td>
</tr>
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<td></td>
<td>Incompliance (other workers) Chance (self)</td>
<td>Inexperience (other workers)</td>
</tr>
<tr>
<td>Likelihood of injury/illness</td>
<td>Low probability ‘Won’t happen to me’</td>
<td>Medium to high probability ‘Can happen to me’</td>
</tr>
<tr>
<td>OHS risk-taking</td>
<td>Accept risk taking to ‘get the job done’</td>
<td>Unwilling to take certain risks to ‘get the job done’</td>
</tr>
<tr>
<td></td>
<td>Don’t think of consequences</td>
<td>Consideration of the costs/benefits of risk-taking</td>
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<td></td>
<td></td>
<td>Aware of consequences</td>
</tr>
<tr>
<td>OHS risk control</td>
<td>Individual workers’ responsibility</td>
<td>Individual workers’ responsibility</td>
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<td></td>
<td>Current risk controls sufficient</td>
<td>Current risk controls not sufficient</td>
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<tr>
<td></td>
<td></td>
<td>Cost/organisational constraints (no more can be done)</td>
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<td></td>
<td></td>
<td>Need more enforcement</td>
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</tbody>
</table>
22.3.1 OHS risk perception and recognition

Before first-aid training, the most commonly cited risks were falling from heights (18 participants), power tools (13 participants) and collapse of trenches (four participants). Chronic or delayed effect risks were mentioned much less frequently. Only two participants mentioned delayed effect health risks without prompting, and, even when prompted, most participants indicated that the delayed effect OHS risks they identified, which included inhalation of dusts (four participants) noise (three participants) and skin disease (two participants), were relatively unimportant. As one participant said ‘Illness? Well mainly in what I do you are pretty right. I know there is some propensity when you are cutting certain materials that you have to wear masks, but I don’t know.’

Following first-aid training, this emphasis on immediate effect OHS risks did not change. Out of the twenty-two participants who completed first-aid training, 17 identified falls or working at height to be relevant and 14 identified working with power tools and machinery. Four participants identified the collapse of trenches. The strong emphasis on acute effect compared to delayed effect OHS risks was expressed by one participant as follows: ‘I suppose with heights you are more prone to falling. With dust and things like that, you don’t realise it until later on in life so you look at things that happen there and then rather than the long-term’.

Only five participants identified delayed effect OHS risks without prompting. These included skin cancer (two participants), hearing loss (one participant) and dust (two participants). When prompted to consider work-related illnesses, a further six participants mentioned skin cancer, three mentioned asbestos, two mentioned dust, one mentioned noise and another mentioned working with chemicals. As in the pre-training interviews most participants suggested that these risks were not serious because they are easily controlled, especially in the case of asbestos and skin cancer. Another important theme arising from the discussion of occupational health risks was that participants who were aware of the risk, assume it to be minimal because they are uncertain of the credibility of the source of the information they have received. For example one participant said of chemical risks ‘A couple of people think there might be a bit of a risk in some primer. But nothing’s ever been said so I don’t think so’ and a carpenter said of the risk of wood dusts ‘They talk about the dangers of working with dust but I don’t think it really affects us that much’.

The only change in participants’ awareness of specific OHS risks was the increased awareness of infectious diseases following their receipt of first-aid training. Only one participant mentioned the risk of infectious diseases, such as hepatitis, without prompting but when prompted seven participants identified these illnesses as being relevant to their work. Johnson (1999) identifies the importance of first-aid training in increasing individuals’ awareness of the importance of treating small cuts and abrasions immediately to prevent infections from untreated
wounds. Before first-aid training, participants thought of minor injuries such as nicks, cuts, scratches as a cost of doing business and indicated that they would often ignore such wounds.

These results are consistent with the results of previous studies of laypersons' perceptions of non-occupational risks. For example, Slovic, Fischhoff and Lichtenstein (1981) found that risks associated with a perceived lack of control, fatal consequences, high catastrophic potential, reactions of dread, inequitable distribution of risks and benefits and the belief that risk was increasing and not easily reducible are considered to be greater than risks that are unknown, unobservable, new and delayed in their manifestation.

Thus it appears that, other than raising awareness of the risk of infection, first-aid training had little impact upon participants' understandings of specific OHS risks relevant to their work or the seriousness of these risks. The results generally support hypothesis number one.

22.3.2 OHS risk control

Before training, OHS risks were understood to arise as a result of individual factors. The most commonly cited source of OHS risks affecting other workers was their carelessness or complacency (eleven participants before training). For example, one participant said:

You can educate people till the cows come home. Overconfidence causes most of the problems and there is nothing you can do about it...You can put up a handrail and provide someone with a harness, but they have to choose to use the harness and they have to operate within the boundaries of the handrail. If someone decides it is a nuisance, they will take it down.

However, although before training participants tended to believe accidents to others were attributable to a lack of care or complacency about OHS, only five participants identified carelessness or complacency as being relevant to their personal experience of OHS risk. Eight participants expressed the belief that accidents to themselves were attributable to factors beyond their own control, such as the negligence of others. For example, one participant said: 'There is always the risk of stepping into a puddle and finding out that someone has been negligent and dropped a power cord in there and there is a fault in the leakage switch'. Another commented: 'Well hopefully I won't but things can happen where it is not your fault either, I mean someone could drop a hammer and it could hit you in the head...there is nothing you can do'.

Eleven participants also expressed the fatalistic view that their own personal experience of occupational injury or illness was a matter of luck or chance. For example, one participant said 'Put it this way, in ten years I've had one injury that has taken me to hospital, so that is not to be I think'. Another commented 'I think it
is hard to say. It's your own fate'. The belief that accidents are chance events that 'just happen' is likely to discourage workers from taking appropriate preventive action. Saari (1988) reports a similar result in that 40% of foremen in his survey attributed occupational accidents to chance.

The tendency to attribute events to others to internal causes, and events to oneself to external causes has been observed in previous risk research and is termed 'self-other' bias (DeJoy, 1994).

Following first-aid training, participants still largely attributed OHS risks to individual factors, such as complacency or carelessness. However, the 'self-other bias' that their own personal experience of OHS risks was beyond their control appears to have been reduced. Following first-aid training, 17 participants expressed the importance of taking care and concentrating to avoid occupational injury or illness to themselves. Only four participants mentioned chance or fate and four mentioned the negligence of others as important influences on their own personal experience of OHS risk.

This indicates an increased recognition by participants that their own behaviour is also important in the prevention of occupational injury and disease and is similar to McKenna and Hale's finding that people trained in first aid express a greater willingness to take personal responsibility for safety (McKenna and Hale, 1982).

When asked to identify control measures that should be implemented for the OHS risks they identified as being relevant in their work, participants emphasised individual controls for both themselves and others. Individual controls are those which are intended to act on workers' behaviour whereas technological controls are intended to act on the work environment. This is consistent with previous research findings that, where OHS risks are attributed to factors internal to affected workers, understandings of risk control will be limited to individual controls (Holmes, et al., 1999).

In the technical literature, OHS risk controls should be selected according to a risk control hierarchy. The principle of this hierarchy is that control measures that aim to target hazards at source, and act on the work environment are more effective than controls that aim to change the behaviour of exposed workers. Thus, technological control measures, such as the substitution of hazardous substances or processes and engineering controls are preferable to individual controls, such as the introduction of safe work practices or the use of personal protective equipment. The effectiveness of individual controls for OHS risk is limited because humans are prone to error. The reliance on personal protective equipment is particularly limited since such equipment:

- frequently does not provide the protection claimed;
- is uncomfortable to use;
- often makes working difficult;
- can create a hazard itself; and
First aid and preventive training

The most commonly cited control measures before first-aid training were use of personal protective equipment (seven participants), training and education (six participants), supervision (three participants) and correct work procedures (two participants). In contrast, technological controls, such as the use of scaffolds and handrails to prevent falls or the use of mechanical lifting devices to avoid manual handling were mentioned by only six participants. Following first-aid training participants still predominantly emphasised control measures that individual workers could or should take. For example, one participant said of the risk of falling:

'With construction, falls is up to you. If you work off a ladder, you've got to try and tie the ladder up. So it all comes back to you doing the things you're supposed to be. If you fall off, have a harness so that you can't hit the ground'.

Eleven participants mentioned personal protective equipment, 12 participants mentioned the need to take care and concentrate at work, five participants mentioned safety education and training and four participants mentioned safe work procedures. Nine participants also mentioned the need for technological or engineering controls to reduce OHS risks.

Understandings of OHS risk control that focus on individual controls are likely to hinder the adoption of more effective technological solutions to control OHS risks (Lingard and Holmes, 2000). First-aid training does not appear to change participants' emphasis on individual OHS risk controls and they appear resigned to bearing the burden of responsibility for the prevention of injury and illness themselves. Thus, the research results generally support hypothesis number two.

Despite the fact that first-aid training did not substantially change participants' understandings of the different options for controlling OHS risks relevant to their work, interview data do suggest that participants were less willing to accept or tolerate prevailing levels of OHS risk after receiving first-aid training. Before receiving first-aid training, fourteen participants expressed the belief that the OHS risk controls currently adopted in the building industry were sufficient. Following first-aid training, eleven participants expressed the view that OHS risk control measures currently implemented are not sufficient whereas only eight participants believed them to be sufficient. For example, one participant questioned the effectiveness of personal protective equipment, saying:

'You have to go up and work. You could have safety harnesses but they become very awkward to work with. You get tangled and that becomes a hassle for workers too and you can probably still get injured if you do fall off with a safety harness'
and another commented:

'Sanding, I try to wear a mask at all times. But on a day like today where it is 35 degrees, you can't breathe through a mask so you don't wear it but I try to keep the dust away from my face'.

Thus it appears that after training workers did not believe enough was being done to reduce OHS risks in their workplace. Yet at the same time, many participants were not aware of any feasible alternative risk control measures that could be implemented. As one participant remarked 'There are probably a lot more things we could do but I just don't know about it'.

22.3.3 Responsibility for accident prevention

In the pre-training interviews, many participants expressed the unrealistically optimistic belief that 'it won't happen to me'. In comparison to others in their workplace, the largest proportion of participants (nine) indicated that others were more likely to suffer from an occupational injury or illness than themselves. For example, one participant expressed this by saying:

'You make scaffolds that aren't up to scratch I would be the only one to walk on them because I know it's safe for me but I wouldn't want any one else doing it'.

Nine participants also indicated they had a high degree of personal control over OHS risks and therefore they could avoid injury. One participant expressed this by saying 'I think if you have got your wits about yourself, you can deal with anything'. This is consistent with previous research findings that a belief that personal skill is more important in avoiding accidents and a tendency to overestimate the degree of personal control over events contributes to the belief that 'it won't happen to me' (De Joy, 1994).

Before first-aid training, another group of participants attributed their comparatively low probability of suffering a work-related injury or illness to their experience in their job. One participant expressed this by saying:

'I'm probably less likely [to have an accident] because I've been doing it a long time. Not like the young guys running around madly...[they] run into things, fall off the roof and try to carry heavy weights too quickly'.

Weinstein (1980) also discovered that a sense of 'unrealistic optimism' about the probability of being involved in an accident increased with experience.

Following first-aid training, 18 participants indicated that they had a medium to high probability of personally suffering from a work-related injury or illness. Only three participants said the chance of them suffering a work-related
injury or illness was low. One of these was an office-based site manager while another had just returned to work on 'light duties' having suffered a work-related back injury. First-aid training seems to reduce workers’ sense of 'unrealistic optimism' about their likelihood of experiencing a work-related injury or illness and strengthens the link between risk-taking behaviour and undesirable outcomes in the minds of participants. Thus it seems that first-aid training can help to overcome the motivational problem that workers’ direct personal experience of serious negative OHS consequences is rare.

Before participants underwent first-aid training, when asked whether they ever knowingly took unnecessary OHS risks at work, the majority (23) indicated that they did. When asked what types of risks these were, 12 participants indicated that they were associated with working unsafely at height, for example using unsafe scaffolding, using improvised means of gaining access to height or failing to use a safety harness when required. A further five participants indicated that they occasionally took unnecessary risks using power tools and another four said they sometimes failed to use the correct personal protective equipment. There was a strong acceptance of risk-taking behaviour as 'part of the job'. Only two participants suggested that risks should not be taken or that they were concerned about taking risks.

These results suggest that, despite the perceived seriousness of the risks of falling from height and power tools, risk-taking behaviour is widely accepted in these two aspects of construction site safety. This apparent willingness to take OHS risks that are understood to be serious may be due to the prevalent belief before first-aid training, that 'it won't happen to me'.

When asked why they took such risks, the most commonly cited response (nine participants) was 'to get the job done.' This reflects a strong production orientation among construction workers. Four participants also explained risk-taking behaviour in terms of work habits developed over a long period. For example, one participant said people took risks:

'because in the days when they started work it was accepted work practice and they have done it through their entire working career and not had an accident and continue to work in that fashion'.

Following first-aid training, participants did not express such a ready acceptance of risk-taking behaviour. Only eight participants expressed an unreserved willingness to take OHS risks to 'get the job done'. Twelve participants suggested that they would take OHS risks but only under certain circumstances. Five participants indicated that they had taken such risks in the past but that they were less likely to do so now. Three participants said they sometimes took risks that they recognised that they should not take. Four participants indicated that they would consider the costs and benefits before taking an OHS risk and base their behaviour on a 'calculated risk', only taking risks where the benefits outweighed the costs and where they considered the risk to be 'worth it.'
It seems likely that participants' stronger belief that they could personally suffer an occupational injury or illness, following first-aid training, renders them less comfortable about taking unnecessary risks. The recognition that unsafe behaviour can result in injury or illness thus appears to increase participants' motivation to work safely. These results lend support to hypothesis number three.

22.3.4 OHS behaviour

Table 22.2 shows the average ISM and GSM performance scores for the four categories of performance measured before and after participants received first-aid training.

<table>
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<tr>
<th>Category</th>
<th>Global safety measure</th>
<th>Individual safety measure</th>
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<tr>
<td></td>
<td>Pre-training (% safe)</td>
<td>Post-training (% safe)</td>
</tr>
<tr>
<td>Use of tools</td>
<td>97</td>
<td>96</td>
</tr>
<tr>
<td>Access to height</td>
<td>47</td>
<td>78</td>
</tr>
<tr>
<td>PPE</td>
<td>60</td>
<td>95</td>
</tr>
<tr>
<td>Housekeeping</td>
<td>79</td>
<td>85</td>
</tr>
</tbody>
</table>

In the ISM, safety performance was generally highest in the 'Use of Tools' category with scores of 94% safe and 98% safe for the pre and post-training measurements respectively. Safety performance was lowest in the 'Access to Heights' category in which the pre-training score was only 51%. The post-training score for 'Access to Heights' rose to 93%. The use of 'Personal Protective Equipment' was found to be 65% safe before and 96% safe after participants received training. 'Manual handling' was found to be 85% safe before training and 80% safe after training.

Paired Samples T-tests were conducted, using the SPSS 8.0 for Windows software package, to assess the statistical significance of these changes. The improvement in the use of 'Personal Protective Equipment' was found to be highly significant (t=3.352, 13df, p=0.005). The improvement in the 'Use of Tools' approached significance (t=2.066, 8df, p=0.073). However, neither the improvement in 'Access to Heights' (t=2.018, 4df, p=0.114) nor the deterioration in 'Manual Handling' safety (t=1.890, 2df, p=0.199) was significant.

As with the individual safety scores, safety performance was generally highest in the 'Use of Tools' category with scores of 97% safe and 96% safe for the pre and post-training measurements respectively. Safety performance was lowest in the 'Access to Heights' category in which the pre-training score was only 47%. The post-training score for 'Access to Heights' rose to 78%. The use of 'Personal Protective Equipment' was found to be 60% safe before and 95% safe
after participants received training. Site 'Housekeeping' was found to be 79% safe before training and 85% safe after training.

Paired Samples T-Tests were conducted to assess the statistical significance of these changes. The improvement in the use of 'Personal Protective Equipment' was found to be very highly significant \((t=5.325, 19\text{df}, p=0.000)\). The improvement in 'Housekeeping' was also found to be significant \((t=2.757, 20\text{df}, p=0.012)\). However, neither the improvement in 'Access to Heights' \((t=1.090, 11\text{df}, p=0.299)\) nor the slight deterioration in 'Use of Tools' \((t=0.346, 19\text{df}, p=0.733)\) was significant.

In both individual and global performance, safety scores in three of the four categories measured were higher following first-aid training indicating an improvement in safety over pre-training performance. These improvements, some of which were statistically significant, suggest that first-aid training has a positive effect on OHS behaviour. Thus some evidence was found to support hypothesis number four.

The finding that improvements in safety behaviour were not confined to the individuals who had undergone first-aid training was unexpected. It is not clear why this effect occurred but it was possibly due to the fact that many of the participants performed a supervisory role and, through this supervisory influence, their increased motivation to avoid injury brought about a general improvement in site safety.

22.4 CONCLUSIONS AND RECOMMENDATIONS

In combination, the results of the behavioural observations and the interviews yield important information about the effect of first-aid training. Observations at participants' worksites suggested that, for the most part, the first-aid training had a positive effect on the OHS behaviour of participants. However, interview data revealed that, other than raising awareness of the risk of infectious diseases, the first-aid training did not increase participants' understandings of the nature or severity of specific OHS risks relevant to their work. First-aid training appeared to reduce participants' 'self-other' bias, making them more aware that their experience of OHS risks was not beyond their control but that their own behaviour was also an important factor in the avoidance of occupational injury and illness. First aid training also appeared to reduce participants' willingness to accept prevailing levels of OHS risk. Participants' understandings of methods by which OHS risks can be controlled were unchanged by the first aid training and are limited to individual controls. First-aid training did appear to increase participants' perception of the probability that they would suffer a work-related injury or illness and they also expressed greater concern about taking risks at work after receiving first aid training. It therefore appears that first-aid training enhanced participants' motivation to avoid occupational injuries and illnesses. It is possible that the motivational effect of first aid training, coupled with the knowledge, skills and
abilities provided by traditional OHS training would yield greater improvements in workers’ OHS behaviour than either first-aid training or traditional OHS training on its own. As such, first-aid training may be a valuable tool in facilitating the transfer of safety knowledge, skills and abilities, learned in preventive OHS training, into behaviour at the workplace, ultimately leading to enhanced organisational performance.

Traditional first-aid training does not currently improve participants’ understanding of specific OHS risks relevant to their workplace. Neither does it raise general awareness of what can be done to control OHS risks. However, the implication of these findings for training course content and delivery is that it may be beneficial to integrate first-aid training and preventive OHS training to achieve greater overall effectiveness. For example, there may be an opportunity in industry-specific first-aid training to incorporate information about the OHS risk-profile and the nature and severity of OHS issues relevant to the industry. This may be particularly helpful in the case of lesser known, health risks. Similarly, there may be an opportunity to discuss preferred, technological options for OHS risk control, such as the substitution of hazardous chemicals with less hazardous alternatives or the provision of ventilation to prevent dust inhalation, in first-aid training.

The extent to which can be achieved in industry-specific integrated training courses should be investigated. However, before such an approach has been developed and rigorously evaluated, an interim approach could be to link preventive safety and first-aid information in courses designed to complement one another. One solution to this would be to ensure the training programme closely reflected the work environment to ease the transfer (Yammill and McLean, 2001). For example, first-aid training courses could be designed to encourage people to think about OHS risks in their workplace in using visual imagery so that the first aider can relate the training to their own work environment. This is a similar approach to that used in sports psychology in which the athlete is taught to mentally rehearse performance. Alternatively, training could be conducted at the workplace and injury scenarios created by placing the Resusci-Annie at a location on site. First-aid trainees could be given ‘homework’ of thinking up three or four commonplace situations they find themselves in at work and asked to imagine emergency situations involving breathing, bleeding, breaks and burns in each of the situations (Cooper, 1995). This would encourage them to think about OHS risks relevant to their work and would probably enhance the motivational effect of first-aid training on their safety behaviour as well as the perceived relevance of the first-aid course to their work. Industry-specific first-aid courses could present information about injuries and illnesses and their treatment in the context of how they could occur in the participants’ own workplace. Another option would be to relate injuries to the OHS risks relevant to first-aid training participants’ work, such as discussing wounds occurring while using power tools, burns from bitumen, or occupational asthma arising from exposure to chemicals. This would serve the
dual purpose of providing participants with the skills to treat injuries and illnesses and improving their understanding of specific workplace OHS risks.

22.5 REFERENCES


First aid and preventive training


22.6 ACKNOWLEDGEMENTS

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