Working as a Nation to Prevent Injury
Better Health Outcomes for Australians

Prevention of Injuries associated with Do-It-Yourself Activities

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COMMONWEALTH DEPARTMENT OF HUMAN SERVICES AND HEALTH
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Prevention of Injuries associated with Do-It-Yourself Activities

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David Caple of David Caple and Associates provided helpful ergonomic consultant advice to this project.
Glossary

CFS – Coroner’s Facilitation System
DIY – Do-It-Yourself
ECOSA – European Consumer Safety Association
GFCI – Ground Floor Circuit Interrupters
HSO – Health and Safety Organisation
ICE – Institute for Consumer Ergonomics
LRH – Latrobe Regional Hospital
MUARC – Monash University Accident Research Centre
NISU – National Injury Surveillance Unit
OH&S – Occupational Health and Safety
PANCH – Preston & Northcote Community Hospital
PPCE – Personal Protective Clothing and Equipment
RMH – Royal Melbourne Hospital
RVEEH – Royal Victorian Eye & Ear Hospital
US CPSC – United States Consumer Product Safety Commission
VIMD – Victorian Inpatient Minimum Dataset
VISS – Victorian Injury Surveillance System
WH – Western Hospital
Executive Summary

The aim of this study was to examine the feasibility of piloting projects to transfer safe work practices from work to home through the identification of a set of priority issues that offer good potential for improving the safety of Do-It-Yourself (DIY) home handyperson activities.

The major mechanisms for review were: data analyses, a literature search and review (including formal, informal and international sources), industry consultation and selection of areas of focus through a matching process. Consultation with industry during the course of this project aimed to establish the groundwork required for the next stage – the implementation and evaluation of interventions.

Results

Data analyses

Data analyses for DIY injuries were undertaken for three levels of injury severity: emergency department presentations, hospital admissions and deaths.

Emergency department presentations

Within the Victorian Injury Surveillance System emergency department database DIY injuries included: general maintenance (63% of cases), gardening (19%), vehicle maintenance (13%) and electrical (0.03%). Three quarters occurred in a residential setting, particularly the victim’s own garden, excluding driveway (57%). By far the most frequent injury outcomes were finger and hand lacerations and foreign bodies in the eyes. Almost one half of injuries were to the upper limbs, almost one third to the head (including eyes) and 18% to the lower limbs.

Eighty five percent of maintenance injuries were to males; male injury was predominant at all ages. Women were more likely to be injured while gardening (42% of women v 15% men), by lawn mowers, spiders and insects, and unpowered garden tools; men by lawn mowers, unpowered garden tools, ladders, saws, chainsaws and nails. Men were predominant in injury categories other than gardening, especially for grinding, welding and motor vehicle parts.

Injuries peaked at 30-34 years for both sexes. The next most frequently injured age group for women was the 70+ age group. Over half of the victims in this age group were gardening when injured and almost half were injured on falling. There was considerably more variation in frequency of injuries between age groups in males.

DIY cases were more highly represented at the Latrobe Regional Hospital (LRH) than at urban hospitals (maintenance cases were 14% of all adult injuries at the LRH, 6% of urban cases). These data raise the question of whether rural dwellers undertake more home maintenance tasks and are therefore more exposed to the risk of injury.

National Injury Surveillance Unit (NISU) emergency department presentations for DIY injury, as with VISS data, peaked in the 25-34 year age group and a similar proportion of those injured was male (85%). NISU data had a higher proportion of gardening (25% NISU, 19% VISS) and vehicle maintenance (17% NISU, 13% VISS) injuries. There were more presentations in the general maintenance injury category in Victoria. The safety device wearing rate appeared to be extremely low (5%) in the national data, compared with VISS data (13%), and the reported cases were confined to safety glasses. VISS data included more partial burns and inflammation, NISU more sprains/strains. Otherwise the injury distributions were very similar. NISU data had higher frequency rankings for injuries from vehicle parts, knives and circular saws, VISS was higher for lawn mowers and nails and screws.

Hospital admissions

There are codes applicable to ladder, woodworking, powered hand tools, lawn mowers and electric current injuries in the ICD9-CM coding system. Hospital admission data for these codes was extracted from the Victorian Inpatient Minimum Dataset over the seven years 1987/88 to 1993/94. Ladders were the most frequent cause of injury (n=3247), followed by powered hand tools (2749), wood-working machinery (2539), powered lawn mowers (759) and electrical current (188). Rate data showed an upward trend for 15 years of age and
over for all these codes but only the trend lines for ladders and woodworking were significant.

**Coronial data**

Over the three years of the computerised Victorian coronial data collection 1989/90 – 1991/92, there were 44 cases of DIY injury fatalities. Nineteen of these cases were hit or crushed, principally by tractors (5), backhoes (3) or trees (3); 11 were falls – 7 from ladders; 10 were electrical and 2 were burns. The tractor fatalities were all the result of rollovers.

**International comparison**

In recent years, both Norwegian and VISS data exhibit an increase in hobby and garden tool injuries. Ladders have a high ranking in both Victoria and Norway, lawn mowers are higher in Victoria than in Norway. Circular saws, chainsaws, hatchets, axes and handsaws (wood cutting equipment) have a higher frequency ranking in Norway. However, the top ten ranked factors were similar. This indicates that international exchange of information on injury prevention is appropriate.

**Literature review**

The Medline search, a request for relevant articles from the Documentation Centre, Consumer Safety Institute (Netherlands) and other sources of informal literature produced articles which fell principally into these categories: welding, ladders, woodworking, home repair and wood-related construction, power tools, eye injuries (particularly in regard to eyewear and hammers), slips and falls, electrocutions, hiring, legislative requirements, home safety kits and handyman books and magazines.

Relevant points noted in the literature were:

- recent technological developments in safety are not always provided to workers or incorporated into current models or standards;
- workers did not always perceive their job as hazardous, even if the injury rate was high;
- non-compliance with safety rules was found to be the most frequent single cause of injuries (especially for ladders);
- most injury incidents occurred when older equipment was being used (especially mowers);
- a large proportion of the power tools examined (94%) were found to be unsafe, principally because they lacked essential safety features, had dangerous or unsatisfactory electrical wiring, lacked maintenance or suffered from wear and tear;
- one in ten respondents to a consumer magazine survey of members admitted owning no safety equipment;
- the public needs to be educated about the vulnerability to injury of bystanders;
- people often grab whatever tool is available without considering what is the most appropriate tool for the purpose, particularly hammers and screwdrivers;
- safety of equipment; and
- provision of protective equipment and advice given by hire shops was found to be inadequate in a consumer magazine survey.

The overwhelming finding of manufacturers of safety eye-wear is that style and especially comfort (including fit) are important considerations affecting a worker's inclination to use it. Employers do not always purchase size adjustable eyewear due to its extra cost. A greater variety of styles incorporating improved ergonomic designs and more lightweight, smaller glasses has led to increased use of protective gear in the workplace. Major complaints about eye protectors were that they misted up frequently and also that the field of view was considerably restricted. There was an underestimation of the importance of wearing eyewear while hammering.

One of the most relevant resources was the Do-It-Yourself Home Safety kit produced in 1992 by Queensland Health as part of the Safety at Home Series. The kit, including manual and video, offers advice on safety steps to be taken with a wide range of DIY equipment.

The Equipment (Public Safety) Act 1994 and the Equipment (Public Safety) (General) Regulations 1995 are new Victorian legislative requirements which (together with those of other states and territories) need to be investigated further to see if they cover DIY.
Industry consultations

In discussions with industry, DIY injury prevention was considered within the broader context of “off-the-job” safety since this was how industry regarded the concept. Most companies felt they had to get workplace injuries to an acceptable level before they moved onto off-the-job injury prevention.

There is a difference in the extent to which large and small employers can provide off-the-job injury prevention activities. In addition, the activities of some companies are more relevant to DIY activities than others and company structures influence how off-the-job safety information is passed on to employees.

Some large companies have embraced the concept of off-the-job safety. Such companies have a multifaceted approach to reducing off-the-job injury.

Although many companies did not regard themselves as actively pursuing off-the-job safety, some relevant activities were in fact commonly pursued eg. approval to borrow, with the consent of the supervisor, safety equipment and tools. There were other activities which were less common and were mainly undertaken by highly motivated companies eg. establishing a Home, Health and Safety Committee which organises safety activities.

There were several examples of industry supporting injury prevention in the community eg. sponsorships of programs undertaken by the Child Safety Centre, Kidsafe, the Shire of Bulla Safe Living Program and MUARC.

The growing trend for employees to work at home lends greater importance to developing the policy of safe work practices in the home and taking a holistic approach to occupational safety.

Goals and targets

The objectives of this project are consistent with strategies listed in the national and State Injury Goals and Targets. The relevant national strategy is the fourth strategy listed for home handypersons as outlined in ‘Better Health Outcomes for Australians’. The relevant Victorian strategy is listed in the chapter on Workplace Injuries in ‘Taking Injury Prevention Forward’.

Recommendations and strategies

The next stages to achieve injury reduction are to develop priorities and targets, implement strategies and establish monitoring and review processes. The direct transfer of workplace safety is only one of a number of promising strategies or interventions. The implementation strategies from which choices can be made focus on workplace initiatives, education, regulation, research, policy and overcoming economic barriers. Countermeasures should be formally evaluated and the ‘culture of safety’ needs to be enhanced so that consumers buy with safety in mind. The recommendations also include infrastructure and research needs.

Recommendations

The recommendations outlined below are suggested priorities for action which aim to address the infrastructure and information needs and to guide the implementation of already available interventions.

- Identify a lead agency and source of funding.
- Commission a follow-up study to determine the extent to which DIY injuries relate to particular industry groupings.
- Convene a national workshop/seminar to promote the notion of off-the-job safety focused according to the outcome of the above study on occupational health and safety professionals, corporate management and other relevant bodies.
- Commission a study to determine attitudes to DIY injury prevention. This would assist the design of interventions and test acceptability of proposed solutions.
- Implement intervention programs on specific issues eg. eye injuries and hand injuries during DIY activities.
- In order to facilitate safer product designs, establish an injury and complaints data and information clearing house for manufacturers, importers, wholesalers, retailers, consumer associations and other relevant bodies.
• Commission in depth studies of particular agents to determine mechanisms of injury where these are not apparent from existing data sources.

• Explore with Local Government departments and at the Commonwealth and State Government levels the potential for enhancement of the municipal home handyperson services or the development of other organised low cost home maintenance services as an alternative to unskilled householders attempting home maintenance activities.

It is recommended that the Commonwealth Department of Human Services and Health should assume responsibility for encouraging and overseeing the implementation of the strategies and recommendations in this report and monitoring the outcomes in terms of both uptake of protective measures and DIY injury reductions.
Chapter 1 - Introduction

1.1 Rationale

Injury occurring in the home and surrounds accounts for approximately 30% of all adult injury and results in more days lost from work than 'on the job' injuries. Many of these injuries, including those associated with Do-It-Yourself (DIY) activities, could be prevented by applying principles developed and applied in the workplace for similar problems. Some major corporations have identified this possibility and have adopted 24 hour/day safety policies with a view to translating workplace safety to other settings, particularly the home. In turn, 'off-the-job safety' results in fewer worker absences (Personal communication, Hamilton, S, Du Pont). With recent improvements to injury data collections, it is now possible to specifically identify problems which can be matched with accepted, if not proven, countermeasures from the workplace. Transfer of workplace safety is an emerging topic at conferences (Workcover 1994) and in publications (Workwords no. 10, September 1994, Victorian Occupational Health and Safety Authority).

1.2 Definition

Do-It-Yourself (DIY) activities have been defined as 'activities which could have been done by a professional craftsman'. Activities with a recreative or recreational focus are included in the definition whereas activities which are paid for and care activities are excluded. People's motives for undertaking DIY activities vary, from saving money to spending free time in an agreeable way. (Venema, 1991)

In discussions with industry the broader term 'off-the-job injuries' was used. DIY injury is only one aspect of these injuries.

1.3 Aim

The aim of this review is to examine the feasibility of piloting projects to transfer safe work practices from work to home through the identification of a set of priority issues that offer good potential for improving the safety of DIY home handy person activities.

1.4 Specific objectives

- Data analysis of major DIY problems including an urban/rural breakdown if feasible;
- Literature review focusing on published literature on the prevention of occupational and home injuries, including the effectiveness of countermeasures;
- Review of informed sources including international and Australian companies, H&SO (Victoria), Worksafe, Workcover, E.C.O.S.A (Netherlands), ICE Ergonomics (UK), and the Farmsafe secretariat;
- Review of evaluations and categorisation of effectiveness of countermeasures;
- Include Public Health trainees placed at MUARC in this project to the extent possible;
- Outline pilot projects to transfer safe work practices from work to home; and
- Co-ordination of the work of this project with national and state injury Goals and Targets.

The objectives of this project are consistent with strategies listed in the national and State Injury Goals and Targets. The relevant National strategy is the fourth strategy listed for home handypersons as outlined in 'Better Health Outcomes for Australians'. The relevant Victorian strategy is listed in the chapter on Workplace Injuries in 'Taking Injury Prevention Forward'. This strategy, on off-the-job safety, is as follows:

To generate a broader perspective on workplace safety by encouraging employers to develop off-the-job safety programs. The aim is to change the culture of the workforce regarding safety, and to reduce costs to employers from time lost due to non-workplace injuries.

(Unfortunately it was not possible to include Public Health trainees in this project as their placement did not coincide with the period of this study).
1.5 Method

Priority issues were generally determined by matching main causes of frequent DIY injuries with solutions from industry settings. These may be specific or generic solutions. The major mechanisms for review were data analyses, literature searches, including both formal and informal sources, consultation and selection of areas of focus through a matching process. Consultation with industry during the course of this project aimed to establish the groundwork required for the next stage of implementation and evaluation of interventions.

1.5.1 Data analyses

Three major datasets were analysed to determine DIY priority injury issues:

- Victorian Injury Surveillance System (VISS) (detailed analyses) and National Injury Surveillance Unit (NISU) data (for a national perspective and inter-state variations).
- Hospital admission data – relevant trend data from the Victorian Inpatient Morbidity Database (VIMD).
- Coroner's data

Comprehensive and detailed analyses of Victorian Injury Surveillance System/National Injury Surveillance Unit data were undertaken because of the specific information available on the activities and products involved. To the extent possible, the context of occupational injuries was examined and priority issues determined on the basis of frequency, severity and preventability.

1.5.2 Examination of solutions from industry settings

The three methods employed here were a literature search and local and international consultations.

- Literature searches

Literature searches were undertaken with a particular focus on the occupational health and safety literature for successful countermeasures which could be utilised for DIY or other injuries in residential settings. Specific information on DIY injury prevention was scarce and almost non-existent on transfer of countermeasures from the workplace to the home. Relevant informal literature was accessed by networking with appropriate organisations and individuals.

- Industry, union and occupational health and safety authority consultations.

Meetings and telephone discussions were held with occupational health and safety experts from the relevant industry groups. A consultant with expertise in workplace interventions was engaged to provide specific intervention and strategy advice.

- International consultations

During March 1995 Dr Joan Ozanne-Smith, the Chief Investigator, held discussions with international injury prevention experts at and following the ECOSA and Nordic-Dutch product safety conferences held in Amsterdam.

1.5.3 Relation of major DIY problems to solutions

As the result of data analyses, literature reviews and the consultation process, priority DIY and other injury problems with potential for the application of workplace and other solutions were matched by the researchers.

1.5.4 Development of recommendations

A number of methods were employed to develop the recommendations presented in this report. The processes included:

- determining if the intervention has already been implemented elsewhere;
- holding meetings with relevant occupational health and safety experts;
- following up any evaluation information of the Home Safety Lecture kit (developed by MUARC for Esso Australia) and the Queensland DIY kit or other materials from other sources.

Recommendations were based on the aim and specific objectives outlined above. In particular, mechanisms of transfer and their feasibility were examined. Where appropriate, pilot projects to transfer safe work practices from work to home are outlined.
Emergency department injury surveillance including admitted cases and coronial data are the best available sources of information on residential DIY or maintenance injuries. Some characteristics of the cases indicate that the nature of these injuries and those injured support the principle of the transfer of workplace safety practices. Other characteristics suggest that additional strategies are required.

2.1 Victorian Injury Surveillance System data

2.1.1 Frequency

The Victorian Injury Surveillance System (VISS) commenced data collection on injury and poisonings from emergency departments in February 1988. Initially only children's data was collected. The collection of adult data commenced in January 1991 at Western Hospital. Adult collections at Latrobe Regional Hospital, Preston and Northcote Community Hospital and the Royal Melbourne Hospital followed. The Latrobe Regional Hospital is the only rural hospital; the others are major hospitals located in the north-west regions of Melbourne. The data analysed in this report represents 8 hospital years of adult data where an adult is defined as aged 15 years or over. There are almost 60,000 adult cases of injury in this eight hospital year dataset. An example of a form used to collect this data is in Appendix 4.

There were 5215 cases of DIY injury for adults 15 years and over, representing 9% of adult injuries presenting to hospital emergency departments. There were four context categories analysed under DIY (referred to as maintenance in the VISS coding manual). These were general maintenance (63% of cases), gardening (20%), vehicle maintenance (13%) and electrical (0.03%). Three quarters of the DIY injuries occurred in residential settings, mostly in the victim's own garden, excluding driveway (57% of DIY injuries).

2.1.2 Injuries

Finger and hand lacerations and foreign bodies in the eyes were by far the most frequent injury outcomes, where up to 3 injuries can be noted per case. Almost one half of injuries were to the upper limbs, almost one third to the head (including eyes) and 18% to the lower limbs. (See figures 1 and 2).

Figure 1: Body part injured

Head and face 30% – including concussion

Upper extremities 44%

Trunk 6%

Lower extremities 18%

Other 2%

Source: VISS – LRH (3 yrs), WH, RMH (2 yrs), PANCH (1yr). Up to 3 injuries can be noted per case.

n = 5,893 injuries
Figure 2: Nature of injury

- Lacerations: 29%
- Foreign Bodies: 14%
- Fractures: 10%
- Burns: 9%
- Inflammation, swelling: 8%
- Sprain/strain: 6%
- Bruising: 5%
- Abrasions: 5%
- Other: 15%

Source: VISS - LRH (3 yrs), WH, RMH (2 yrs), PANCH (1yr)

Up to 3 injuries can be noted per case.

2.1.3 Age and sex

Figure 3: Age and sex differences

Source: VISS - LRH (3 yrs), WH, RMH (2 yrs), PANCH (1yr)
Males experienced 85% of DIY injuries and predominated at all ages. Women were more likely to be injured when gardening (42% of women v 15% men) by lawn mowers, spiders and insects and unpowered garden tools; men by lawn mowers, unpowered garden tools, ladders, saws, chainsaws and nails. Men were predominant in categories other than gardening, especially for injuries which involved grinding, welding and motor vehicle parts.

Injuries peaked at 30-34 years for both sexes. The next most frequently injured age group for women was the 70+ age group. Over half of the victims in this age group were gardening when injured and almost half were injured on falling. Men's injuries reached a peak at 30-34 years and declined rapidly. Women's injuries were spread more evenly over the age groups (see figure 3).

2.1.4 Urban v rural

DIY cases were more highly represented at the Latrobe Regional Hospital (LRH) than at the Melbourne urban hospitals (DIY cases were 14% of all adult injuries at the LRH, 6% of urban cases). These data raise the question of whether rural dwellers undertake more home maintenance tasks and are therefore more exposed to the risk of injury. General maintenance injuries were slightly higher in the Latrobe Valley than in Melbourne (68% LRH maintenance v 64% Melbourne). Admission rates were considerably higher in Melbourne hospitals than LRH (17% Melbourne, 11% LRH). The lower admission rate is typical for LRH, suggesting that less severe injury cases attend the LRH emergency department, perhaps as an alternative to General Practice. Melbourne was slightly over-represented for gardening injuries compared with the Latrobe Valley (21% Melbourne v 19% LRH). Melbourne was slightly higher for vehicle maintenance (15% Melbourne v 12% LRH). Therefore, the injury context breakdowns did not show a great difference between Melbourne and the Latrobe Valley.

Foreign bodies in the eyes were particularly high at the LRH compared with Melbourne (18% of LRH cases v 10% Melbourne), partly because many Melbourne eye injury cases would attend the Royal Victorian Eye and Ear Hospital. At the LRH, foreign bodies in eyes were predominantly from grinders, wind blown particles, welding equipment, lawn mowers and drills. Finger and hand lacerations were the most frequent injury at both locations (approximately 20% of cases). Burns to the eyes were higher in Melbourne (16% Melbourne v 1% LRH). In Melbourne these were almost all flash burns from welding equipment.

2.1.5 Major categories of DIY injury

Three major context categories within the VISS data system were relevant to this study – general maintenance, gardening and vehicle maintenance. A fourth category, electrical maintenance injuries, was minor as the numbers were very few.

**Gardening (n= 1045 cases)**

These cases were 66% male and they occurred more frequently in the warmer months. Only 5% of cases reported wearing safety equipment. Lacerated fingers (14%), foreign bodies in the eyes (5%), abraded eyes and fractured fingers were the most frequent injuries. Lawn mowers (18%), stick/branch/tree (11%), foreign bodies, unpowered garden tools, ladders and spiders/insects were the factors which most frequently caused injury to gardeners.

**Vehicle maintenance (n=698 cases)**

These 'off-the-job' injuries were almost all to males and were concentrated in the 20-29 year age group. Half occurred in residential locations. The most common injuries were lacerated fingers and hands (18%), partial thickness burns to the forearms, face and hands (15%) and fractured metacarpals (4%). The burns were most often scalds incurred while removing radiator caps and lacerations from the vehicle itself, handtools, grinders or knives.

**DIY/other maintenance (non-vehicle, non-gardening) injuries (n=3470)**

These injuries peaked in the 30-34 year age group, were predominantly to males (85%) and occurred most often in the garden or garage, excluding driveway (63%). Injuries were most often foreign bodies in the eyes (15% of injuries), finger lacerations (14%), hand lacerations (5%), partial thickness burns to the eyes (5%), superficial abrasions to the eyes (3%), inflammation, swelling, oedema, pain to the eyes (3%) and face and scalp lacerations (2%).

2.1.6 Major factors and characteristics of DIY related injury

The major factors and characteristics of DIY injury are summarised in Table 1.
Table 1: Major factors causing DIY injury and characteristics of DIY injuries

<table>
<thead>
<tr>
<th>Factor Number</th>
<th>Injuries</th>
<th>How happened?</th>
<th>% wearing protective gear</th>
<th>Comments</th>
<th>% Admitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grinders 446</td>
<td>469 total injuries, 59% foreign bodies in eyes, 8% finger lacerations</td>
<td>While grinding</td>
<td>14%</td>
<td>21% specified angle grinders, 4% bench</td>
<td>5%</td>
</tr>
<tr>
<td>Lawn mowers 289</td>
<td>347 total injuries, 41% lacerations including 21% finger lacerations, 14% lower leg lacerations</td>
<td>17% caught body part, slipped under or run over by lawn mower, 17% hit by object thrown by lawnmower, 12% when still operating mower</td>
<td>8%</td>
<td>17 ride-on mowers, 110 cases of children, young children-falls, burns, hit by objects ejected from mower, older children similar pattern to adults</td>
<td>18%</td>
</tr>
<tr>
<td>Ladders 286</td>
<td>353 total injuries, 6% fracture ribs, 6% fracture wrist, 4% finger lacerations, 3% fracture radius/ulna</td>
<td>Victim fell 133 Ladder slipped 54 Painting 47 Gardening eg. pruning 39 Guttering eg. cleaning 30 Roofing 22 Ladder collapse 16 Ladder broke 13</td>
<td>2%</td>
<td>Includes step, extension, step stools</td>
<td>29%</td>
</tr>
<tr>
<td>Vehicle parts 277</td>
<td>323 total injuries, 15% finger lacerations, 10% forearm burns, 6% hand lacerations, 6% facial burns</td>
<td>3%</td>
<td>26% radiators 6% gear boxes 5% bonnet 5% wheel/tyre 4% fan belt 3% bumper bar 2% bonnet</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>Welding 257</td>
<td>309 total injuries, 55% partial burns eyes, 17% foreign body in eyes, 13% inflammation of eye</td>
<td>Flash burns, foreign bodies-metal &amp; slag</td>
<td>4%</td>
<td>11% lifted protection, 1% faulty protection</td>
<td>3%</td>
</tr>
<tr>
<td>Nails, screws, bolts 199</td>
<td>201 total injuries, 39% foot punctures, penetrating wounds, 8% finger lacerations, 6% hand lacerations</td>
<td>30% stood on nail 13% stood on wood that had nail in it, 8% injured by protruding nail 4% mowing lawn when nail flicked up, 3% using a nail gun</td>
<td>5%</td>
<td>5 x boots 4 x goggles 3 x ear muffs 1 x gloves</td>
<td>3%</td>
</tr>
<tr>
<td>Knives 165</td>
<td>170 total injuries, 54% finger lacerations, 18% hand lacerations, 10% forearm lacerations</td>
<td>40% knife slipped 21% slipped while using knife, 4% sharpening knives. Commonly cutting garden hoses, carpet, plaster, vegetables in vegetable garden or killing animals</td>
<td>1%</td>
<td>28% Stanley knives</td>
<td>5%</td>
</tr>
</tbody>
</table>
Table 1 continued: Major factors causing DIY injury and characteristics of DIY injuries

<table>
<thead>
<tr>
<th>Factor Number</th>
<th>Injuries</th>
<th>How happened</th>
<th>% wearing protective gear</th>
<th>Comments</th>
<th>% Admitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power saws</td>
<td>157 total injuries, 49% finger &amp; hand lacerations, 14% foreign body in eyes, 6% finger amputations</td>
<td>22% foreign body 11% saw slipped 11% wood slipped or lost control of wood 7% hand slipped 6% saw slipped back</td>
<td>14% 9 x goggles 5 x gloves 5 x ear protection 2 x boots 2 x other</td>
<td>23% electric 10% bench 6% jigsaws 4% bandsaws 2% hacksaws</td>
<td>30%</td>
</tr>
<tr>
<td>Hammers</td>
<td>121 total injuries, 17% bruising to the fingers, 14% finger lacerations</td>
<td>44% missed object they were hammering, hitting themselves, 13% injured when fragment flew off the object they were hammering, 3% hit by fragment breaking off the hammer, 3% hit by hammer used by other person</td>
<td>3% 2 x boots 1 x glasses</td>
<td>5% sledge hammers</td>
<td>4%</td>
</tr>
<tr>
<td>Hatchets, axes</td>
<td>91 total injuries, 44% finger lacerations, 14% hand lacerations</td>
<td>Axe slipped 20% Victim slipped 16% Missed object aimed at 14% Axe bounced off 6%</td>
<td>8% 4 gloves 2 boots</td>
<td></td>
<td>10%</td>
</tr>
<tr>
<td>Chain saws</td>
<td>91 total injuries, 20% finger lacerations, 12% hand lacerations, 9% knee lacerations</td>
<td>Victim slipped 11% Kickback 11% Chainsaw slipped 7% Sharpening chainsaw 3%</td>
<td>29% 11% goggles 11% ear muffs 10% boots 6% gloves</td>
<td></td>
<td>18%</td>
</tr>
<tr>
<td>Circular saws</td>
<td>88 total injuries, 31% finger lacerations, 25% finger amputations, 8% finger fractures</td>
<td>Victim slipped 10% Wood slipped 10% Saw kicked back or jammed 8% Saw slipped 5%</td>
<td>24% 13% safety glasses 10% other</td>
<td></td>
<td>44%</td>
</tr>
<tr>
<td>Hoists, lifts, jacks</td>
<td>36 total injuries, 8% sprain/strain knee, more serious were crushes, fractures.</td>
<td>Jack fell or slipped 53% Car fell off jack 26%</td>
<td>0%</td>
<td></td>
<td>29%</td>
</tr>
</tbody>
</table>

NB: Up to 2 factors leading to injury and 2 factors directly causing the injury can be noted per case.
2.2 National injury surveillance data

There were 28,973 cases of DIY injuries on the NISU database. Due to the history of the collection approximately 45% of this data was from Queensland, 16% from Victoria, 11% each from NSW and Tasmania and 8% from S.A.

NISU data, as with Victorian data, showed that injuries peaked in the 25-34 year age group and that those injured were mostly male (85%). NISU data had a higher proportion of gardening (25% NISU v 19% VISS) and vehicle maintenance (17% NISU v 13% VISS). Victoria was higher in the general maintenance categories. The safety device wearing rate appears to be extremely low (5%) in the national data, compared with 13% in VISS data, and the reported cases are confined to safety glasses. VISS data included more partial burns and inflammation, NISU data more sprains/strains. Otherwise the injury distributions were very similar. NISU data had higher frequency rankings for injuries from vehicle parts, knives and circular saws; VISS data was higher for lawn mowers and nails and screws.

2.3 Hospital admissions data

The data in this section is from the Victorian Inpatient Minimum Dataset (VIMD) and refers to injury admissions to all Victorian public hospitals. The categories are based on mechanism of injury codes (E-codes). There are codes applicable to ladder, woodworking, powered hand tools, lawn mowers and electric current injuries (see appendix 2). Hospital admission data for these codes was extracted from the Victorian Inpatient Minimum Dataset over seven years – 1987/88 to 1993/94. Ladders were the most frequent cause of injury (n=3247), followed by powered hand tools (2749), wood-working machinery (2539), powered lawn mowers (759) and electrical current (188).

The regression procedure in the Microsoft computer package Excel was used to calculate trends in the frequency of admissions and rates associated with each of these factors. Rates were calculated using population data from the Australian Bureau of Statistics. The data showed an upward trend in rates for 15 years and over but only the trend lines for ladders and woodworking were significant at the 0.05 level (see figures 4 and 5). These trends should be interpreted with caution since the introduction of Casemix funding in 1993 may have altered hospital admission and data coding policies.

Figure 4: Ladder injuries, 15 years and over, rates and trend

Public Hospital Admissions, Victoria, July 1987-June 94

Test for trend = 0.64 (95% CI 0.13, 1.15), p = 0.02, significant


Rate/100,000 pop.
Although there is a code for other hand tools and implements, a NSW study of E-code categories (Eckstein 1994) found that 60% of this category related to pins and needles. A trend in this category is therefore not necessarily an accurate indication of the trend in hand tool injury rates, and therefore has not been calculated. By comparison with hospital admission data, Coleman and Long (February 1995), in their examination of workers' compensation statistics found a consistent reduction in both powered and unpowered hand tool injuries between 1986-87 and 1991-92.

2.4 Fatalities

Over the three years of the computerised Victorian coronial data collection 1989/90 -1991/1992, there were 44 DIY injury fatalities. Nineteen of these cases were hit or crushed, principally by tractors (5), backhoes (3), trees (3) or cars (2); 11 were falls (7 from ladders, 2 from roofs, 1 from a building and 1 while painting); 10 were electrical (2 welding, 2 working with extension cords and the remainder with electrical equipment of various kinds) 2 were burns (one while burning rubbish, the other using flammable liquid); and one was from an explosion of oxyacetylene gas. The tractor fatalities were all the result of rollovers. The criteria for classification as DIY, rather than work-related, was if the context was not noted as being 'on-duty'. This was particularly relevant for tractor fatalities on farms since hobby farmers are included in the DIY category.
Table 2: Summary table for 10 leading causes of DIY injury

<table>
<thead>
<tr>
<th>VISS Presentations</th>
<th>VISS Admissions</th>
<th>Deaths (Coroner's Facilitation System - CFS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grinders</td>
<td>Ladders</td>
<td>Electrical</td>
</tr>
<tr>
<td>Lawn mowers</td>
<td>Lawn mowers</td>
<td>Ladders</td>
</tr>
<tr>
<td>Ladders</td>
<td>Power saws</td>
<td>Tractors</td>
</tr>
<tr>
<td>Vehicle Parts</td>
<td>Circular saws</td>
<td>Backhoes</td>
</tr>
<tr>
<td>Welding</td>
<td>Vehicle Parts</td>
<td>Trees</td>
</tr>
<tr>
<td>Nails, screws, bolts</td>
<td>Grinders</td>
<td>Cars</td>
</tr>
<tr>
<td>Knives</td>
<td>Chainsaws</td>
<td>Burns</td>
</tr>
<tr>
<td>Power saws</td>
<td>Hatchets, axes</td>
<td></td>
</tr>
<tr>
<td>Hammers</td>
<td>Knives</td>
<td></td>
</tr>
<tr>
<td>Hatchets, axes</td>
<td>Welding</td>
<td></td>
</tr>
<tr>
<td>Chainsaws</td>
<td>Nails, screws, bolts</td>
<td></td>
</tr>
<tr>
<td>Circular saws</td>
<td>Hammers</td>
<td></td>
</tr>
</tbody>
</table>

Sources: VISS – LRH (3 yrs), WH and RMH (2 yrs), PANCH (1yr)
CFS – 1989/90 to 1992/93

2.6 International comparison

A study of hobby and garden tool injuries was undertaken by Lund (1994) in Norway using the National Institute of Public Health's Injury Surveillance System. Accidents at home and during leisure time involving tools, machines and equipment accounted for approximately 5% of all accidents involving medical treatment. The injury rates for Norway were similar to those reported in Denmark, The Netherlands and Great Britain – countries which have similar surveillance systems. As in Victoria in recent years, there appears to be an increase in total injuries involving hobby and garden tools. This applies especially to grinding tools, hedge trimmers, welding equipment, ladders and step ladders. The number of injuries involving more traditional tools like knives, screwdrivers, hammers and sledgehammers has remained constant over time. Adult men are over-represented in injuries for all of the product types, in particular power tools. Women have their highest representation in injuries involving stepladders and knives.

The six hobby and garden tools reported most often as associated with injuries in the Norwegian Injury Surveillance System for 1990 were: knife, ladder, handsaw and unspecified saw, angle grinder, axe and lawn mower. The order of these vary with the seriousness of the injuries being examined. There are no exposure studies for these products in the home and during leisure time. Based on categories with high, medium and low exposure the products with the highest risk number are: ladder, knife, circular saw, lawn mower, angle grinder and step ladder.

A comparison of the Norwegian and VISS data revealed that: ladders have a high ranking in both Victoria and Norway; lawn mowers have a higher ranking in Victoria; and circular saws, chainsaws, hatchets, axes and handsaws (wood cutting equipment) have a higher frequency ranking in Norway. Similar factors were ranked in the top ten in both countries. This indicates that international exchange of information on injury prevention is appropriate.
Chapter 3 – Literature review

3.1 Introduction

For the most part the literature review focused on specific products and activities involved in DIY injury. The outcomes of the consultative processes employed in this study are integrated throughout the report. A Medline search was undertaken for the terms ‘do-it-yourself’, DIY, D.I.Y, grinder, ladder, gardening, maintenance, auto mechanic, vehicle mechanic, welding, saws and drilling. Specific information on DIY injury prevention was scarce, and almost non-existent on transfer of countermeasures from the workplace to the home. The majority of published articles were from the occupational health and safety literature.

Additional references were provided from the international consultation with European and Scandinavian authorities and through attendance at the Third International Conference on Product Safety Research and a Nordic/Dutch Product Safety Seminar in March 1995. The Documentation Centre, Consumer Safety Institute (Netherlands) holds a comprehensive database of informal literature, and supplied translated abstracts. Searches of this database yielded further references. Most of these were at least as relevant as those identified in Australia. The Royal Society for the Prevention of Accidents (RoSPA), the Consumer Safety Unit, Department of Trade and Industry, London, the Institute for Consumer Ergonomics (ICE) Loughborough, and the U.S Consumer Product Safety Commission (CPSC) each contributed several articles. There were approximately 60 abstracts provided, of these 24 were concerned with chainsaw safety, 22 with ladders, 10 vehicle maintenance, 11 powered tools, 5 unpowered tools, 8 gardening and 5 electrical saws. There was one report which discussed the design and provision of personal protective equipment rather than outlining dangers and countermeasures.

3.2 Activities and products

3.2.1 Welding

The ocular hazards associated with welding in a Californian study (Pabley & Kenney, 1984) include actinic keratosis (welder’s flash), skin burns, foreign objects in the eye, electric shock, overheating and injuries resulting from explosion or fire. The mainstay of ocular protection from arc welding radiation is a filter placed within the welder’s helmet.

Proctor (1989) discussed protection of the eye during welding in the U.K. Injury to the cornea from ultraviolet radiation, ‘arc eye’, is relatively common and is caused by brief exposure of the eye to radiation from intense electric welding arcs. Arc eye is often caused by the welding rod striking the arc before the lowering of the visor. There has been a temptation to do this because once the filter covers the eyes the welder cannot see the position of the welding rod until the arc strikes. However, in the last few years filters have come onto the market that automatically change from a relatively clear to a darkened state when the arc welding is struck. The welder is therefore able to perform the whole operation from setting up to welding without raising the eye protector.

Shaikh and Bhojani (1991) reported on the occupational injuries and perception of hazards among roadside workers in Karachi, Pakistan who were largely involved in gas welding of mufflers while welding under the vehicle. Thirty-six welders were interviewed and they reported an average of 3 injuries per worker per month. Half complained of some kind of burn, approximately one third of having a foreign body in their eye. One third reported that they did not perceive any hazard in their occupation and over one half did not use any protective device. There was a general acceptance of injuries as part of the job. The non-users either felt no need for goggles or other protective gear (n=13), regarded the devices as uncomfortable (n=6) or blamed their employers for lack of availability (n=4). It is interesting that an activity is not regarded as hazardous even when the injury rate is high.
3.2.2 Ladders

A German article (Wolf et al, 1989) reported on 266 notifiable cases of falls from lean-to-wall ladders in the building industry. More than 50% of injuries occurred to workers while they were climbing ladders. Lower limbs were primarily affected by distortion or dislocation, while upper limbs were more often injured by fractures. Non-compliance with safety rules was the single most common cause of injury.

A U.K. study (Muir & Kanwar, 1993) of 166 victims of ladder injuries admitted to the wards or referred to the fracture clinics of 3 hospitals over a 6 month period, noted that 71% of victims fell because their ladder fell and up to 90% of these injuries were preventable. In ladder injuries at work 90% of victims were aware of ladder safety, yet only 33% had followed the rules. The instances in which the victim (rather than the ladder) fell were mainly confined to those who had not followed instructions, suggesting that the ladder falling group of injuries are mainly preventable.

Of the whole study population, 90% of victims on whom the ladder fell had not taken suitable precautions. The tasks being performed were mostly painting and window cleaning. Only two of this group were not wearing safety shoes or boots, which therefore do not seem to confer any significant protection. A surprising number of elderly people were included in those injured at home. Most people were injured while decorating or working on the roof and guttering. Falls from step ladders gave rise mainly to upper limb fractures, principally of the distal radius through twisting.

Earlier reports on Victorian Injury Surveillance System data (Hazard 14, 1992, Hazard 18, 1994) found that men in the 60-69 year age group were disproportionately represented for ladder injuries in the home. Two thirds of the 254 victims of all ages who were injured while using a ladder were involved in maintenance jobs at the time of the injury, for example, working on the roof (including cleaning the guttering) and pruning or picking fruit. Forty percent of the injuries they sustained were fractures, particularly to the wrist, ribs, radius/ulna and lower leg. There were several recommendations made and these have been included in the list of countermeasures in this report. In the workplace the most frequent scenario was the victim falling by missing steps or simply falling with no further details of how this occurred. Less frequent was the ladder itself slipping or collapsing (27% of cases) or victims, sometimes bystanders or passers by, being injured directly by the ladder.

3.2.3 Woodworking, home repair and wood-related construction

Payne et al (1990) studied 495 patients treated for woodworking, home repair and wood-related construction injuries in Vermont, U.S.A. Forty-two percent of these injuries occurred off-the-job. Overall, 30% of injuries involved use of power equipment, with injury usually resulting from direct contact with the equipment. The only exception was the portable circular or skill saw which was associated with a large proportion of eye injuries from ejected sawdust. Use of non-power equipment was involved in 21% of injuries, and falls from ladders or other elevations in 14% of injuries. In non-work related cases the arm was most frequently injured. Separation of the person from the source of injury was recommended eg. goggles for eye protection and boots for prevention of stepping on nails. However almost one in five eye injuries involved someone who was wearing protective lenses, and problems with fogging or dusting up of glasses were not uncommon, creating their own safety hazards. A more appropriate method of protection that was recommended was the use of saws that have built-in dust collector bags. These afford protection not only to the eyes, but to the respiratory system as well. Most nail injuries occurred to people with bare feet or wearing sneakers with thin rubber soles.

The study recommended identifying specific target behaviours such as safety helmets, early involvement of both top management and employee representatives, and weekly assessment and feedback to employees of target behaviours that are being met or require further effort. These recommendations are clearly not so applicable to the home environment.

between 1986-87 and 1991-92. Hand tool injuries represented 9% of injuries recorded in Worksafe's national dataset of worker's compensation statistics for 1986-87. Foreign bodies in the eyes was found to be the most common injury from these tools. The report attributes the drop to considerable research being directed into design, analysis, safe working practices and injury statistics. Many could have been prevented by safe work practices and the use of appropriate personal protective equipment. (Worksafe News, 1995)

3.2.4 Power tools

One hundred households in the U.K. provided power tools (which had to be at least four years old) for inspection, in a research study conducted by the British consumer magazine Which? (April 1989). They comprised lawnmowers, hedge trimmers or chainsaws. Laboratory staff examined the general condition of the tools with particular regard for mechanical and electrical safety. Ninety-four were revealed to be unsafe, principally because they lacked essential safety features or had dangerous or unsatisfactory electrical wiring. Lack of maintenance or wear and tear reduced safety. There were many instances, particularly with wiring, where home repairs had made power tools unsafe. It was recommended that a tool should be taken to a service agent if it develops a fault.

Petrol mowers were generally the safest machines examined. Most of the problems occurred in older mowers (12-23 years old). These had the 'on-off' control situated on the engine rather than the handle. None of the hedge trimmers gained a satisfactory safety rating. Even new ones did not have all the safety features currently available. Almost all the chainsaws did not have chain brakes, the major means of preventing kickback. Others did not have chain catchers or front handguards.

The report concluded that the vast majority of injuries with garden power tools could be avoided if manufacturers fitted adequate safety features. Most manufacturers still appear to give safety a low priority. The British Standards Institution and its European counterparts appeared unable to incorporate all the important safety features in new standards. For example, power blades in electric lawn mowers should be made to stop quickly once the on-off switch is released, reducing the risk of someone touching a moving blade. Likewise electrical hedgetrimmers should have a 'deadman' on-off switch, which cuts off the power as soon as it is released, two-handed controls so that the hedgetrimer can only be operated with both hands in control and a short blade-stopping time of less than one second. In regard to chainsaw operation many injuries occurred when the chainsaw was being held with only one hand. A British report recommended low profile safety chains with guard links – these are less likely to create a kickback, two-handed switches and a short chain-stopping time of less than a second. A chainbrake is of course essential. Safety awareness among the general public remained very low.

A report based on accident and safety studies undertaken in Britain, Sweden and the USA and on 15 years of testing of garden tools (Which? 1990) concluded that safety and safety features were not taken into account when customers purchased garden tools. The report recommended:

- all power tool manufacturers should show a clear commitment to making power tools safer by incorporating widely recognised safety features, even when they are not required by law or existing standards.
- standards organisations should speed up the process of creating standards for power tools.
- manufacturers, retailers and safety organisations should make a significant effort to publicise the importance of safety features on power tools.
- consumers should be educated to buy with safety in mind so that their purchasing power will encourage manufacturers to produce safer tools and machinery.

3.2.5 General DIY

Another Which? article (August 1990) on the dangers of DIY activities examined data from the Home Accident Surveillance System (HASS) in the United Kingdom, and found that many accidents occurred as a result of home handypersons not thinking ahead about the safety of themselves or others. There were also problems of unsafe working practices, insufficient precautions, inappropriate tools and the lack of safety gear.
The most common injuries were: cutting and piercing, particularly from trimming knives; falling, especially from ladders, step ladders, chairs and stools; struck by an object, particular a hammer, a dropping or falling object; a foreign body in the eye; and burning from hot objects or chemicals.

In a member survey reported in this Which? article, one in ten of the 3000 respondents admitted owning no safety equipment, an improvement on the previous survey which showed one in four. Gloves and eye protectors were the most common items owned, followed by a mask, protective footwear and a safety helmet. It was concluded that one should ask oneself 'Do I have the knowledge, competence and fitness for this job?, 'Do I have the correct tools or equipment to do the job?' Potential hazards should then be identified and protective equipment investigated. With regard to gloves, getting the correct size is important, as is checking that there is still control over finger movements. There are various types of gloves eg. vinyl coated, all leather. It was recommended that items to check when purchasing protective eyewear are scratch resistance, resistance to steaming up, and comfort and fit with and without corrective glasses. There is a British Standard for eyewear which covers performance, design and clarity of vision.

### 3.3 Specific injuries and mechanisms of injury

#### 3.3.1 Eye injuries

**Eyewear**

Doremus (1992) reported on innovations in the design and safety of eyewear comfort in the U.S.A. The overwhelming finding from surveys done by manufacturers of safety eyewear is that style and especially comfort (including fit) are important considerations affecting a worker's inclination to use it. Employers do not always purchase size-adjustable eyewear due to its extra cost. A greater variety of styles incorporating improved ergonomic designs and more lightweight, smaller glasses has led to increased use of protective gear in the workplace.

It was found that the younger generation prefer to use modern looking glasses while the older generation sticks to what is familiar.

Doremus also reported that industries are using many tactics to encourage workers to utilise safety spectacles. Educating workers on the dangers involved when failing to use protective equipment was one of the most important. Industries commonly required orientation programs on such equipment for new workers, and offer similar programs on a periodic basis thereafter. To encourage use, prescription and non-prescription glasses were offered at no cost, and workers often purchased a second pair at cost for use outside the workplace. Disciplinary action for failure to use protective eyewear, such as a suspension from work for a given number of days, generally occurred only as a last resort. She reported that a safety manager of a large company used posters and videos to educate workers on the need for personal protective equipment. Another employer emphasised employee involvement in safety awareness. Employees were also encouraged to identify the reasons for using safety eyewear and help devise company guidelines and policies for the use of protective equipment.

**Occupational eye injuries**

Lambah (1968), in an article 'Adult Eye Injuries at Wolverhampton' reported that in a group of 1017 adults admitted to the hospital (for two days or more) over a 10 year period, most work days were lost due to hammering injuries, light industry and hot metal burns. Accident prevention was generally regarded as better than it had been. However, there are still innumerable tasks which require the use of a hand hammer. The author believed (when the article was written 25 years ago) that there was no answer in this technological age to goggles which steam up, plastic shields and visors which become scratched and are therefore discarded, and no safe hammer.

Fong and Taouk (1995) undertook a survey over 18 months of eye injuries presenting to the Emergency Department of the Royal Victorian Eye and Ear Hospital (Melbourne). They reported that 42% of the 9390 total eye injuries and 29% of the 179 penetrating eye injuries occurred at work. The most frequently injured workers were from the metal, automotive and building trades. Grinding and drilling accounted for injuries to 41% of outpatients and hammering for 53% of penetrating...
eye injuries. Automotive workers had the highest frequency of penetrating injuries, and most were exposed to hammering. They were also the least likely to wear safety eyewear. The researchers concluded that the correct use of safety eyewear would prevent most eye injuries.

Usage rates showed that safety eyewear was least likely to be worn by people engaged in hammering (5%) while those engaged in welding (24%), and grinding and drilling (18%) were relatively more compliant. None of the hospitalised patients injured at home whilst hammering had used any eye protection at the time of injury and none would consider ever using safety eyewear for hammering. Although hammering is well recognised as a highly hazardous activity for penetrating eye injury in the literature, none of the patients wore protective eyewear correctly. A few eyes were injured by metal fragments entering from around the sides of safety glasses. None of the hospitalised workers and home handypeople used correct safety eyewear. Analysis of activities requiring eyewear showed that the correct use of shields and goggles (without safety spectacles) was employed by only 16% of workers and 10% of home handypeople, but adding in the incorrect use of safety spectacles increased the proportions by 20% and 11% respectively.

The study uncovered salient points which need to be addressed:

- a misconception by the workforce and the Australian Standards 1336 that hammering is a low hazard activity;
- the fallacy that safety spectacles offer adequate protection;
- a lack of recognition of the superiority of polycarbonate over CR39 materials by the Australian Standards 1336 and by industry;
- no legal mechanism to enforce Standards; and
- the failure of manufacturers to provide warning labels on tools to alert users of the potential hazards of eye injuries and the need for protective equipment.

Hammers

The danger of the use of hammers causing the retention of intraocular foreign bodies has long been recognised. These injuries may be blinding. Owen et al (1987) cited an early study (Roper-Hall, 1954) which found that of the 75% of patients who had an intraocular foreign body, three quarters were using a hammer at the time of the incident. They also reported that Elkington and Kanski (1973) showed a similar finding in a later study.

In their own study, Owen et al (1987) identified 55 patients who had received an intraocular foreign body and attended an eye unit within the Wessex Regional Health Authority over a four year period. Of these, 36 had suffered the injury at work, 19 while undertaking DIY activities. Seven were bystanders, several of whom were at least two metres away at the time of the incident. One third of domestic injuries occurred to people working on their own cars (32%). Others were injured while chipping stone or concrete or hammering nails. None had been wearing suitable eye protection, yet all injuries could have been avoided if this had been done.

The reasons given for not wearing suitable eye protection fell into three categories: one third felt it was unnecessary; one third said the protection was not available on the shop floor; and the remainder said the various forms of protection were uncomfortable. Major complaints about the eye protectors were that they misted up frequently and also that they restricted the field of vision.

Owen et al concluded that there should be more public education on the dangers of eye injury from hammering. They recommended that DIY retailers stock an adequate supply of suitable eye protectors and that full instructions should be written on the packaging of particular tools. The unacceptability of current eye protectors necessitated the development of better designs that are lighter and have a more acceptable appearance. Misting-up and the restriction of the wearer's visual field needs to be prevented. It was also considered important to educate the public of the possible dangers of watching, or simply passing, someone who is using a hammer.
An article entitled ‘How to handle hammers, screwdrivers and wrenches’ was included in *Family Safety & Health*, Summer 1993. Using US Consumer Product Safety Commission (USCPSC) data, the article reported that injuries concerned with hammers, pliers, wire cutters, wrenches and screw drivers were common. A spokesperson for Stanley Hand Tool division believed that people grab whatever is available without considering the consequences. There are many different types of hammers and the hammer appropriate for the purpose should always be used. The Hand Tools Institute reported that after hammers, screwdrivers are the next most commonly misused tool. They are commonly misused for chiselling, scraping, punching, scoring and prying.

### 3.3.2 Slips and Falls

An article by Eisma in the *USA Occupational and Safety* magazine (February, 1992) on slips and falls in the workplace focused on slips and falls on the floor rather than falls from ladders and scaffolding. Representatives of several facets of workplace slip-and-fall prevention projects met to discuss practices and engineering developments in the measures to control these costly practices. Mats, high friction paint and high friction shoes were recommended to reduce slips where there are likely to be spills of water, grease, oil or food.

### 3.3.3 Electrocutions

Suruda (1992) reported that fatal injuries from portable power tools and appliances continue to be a problem in the US construction industry at temporary work sites. This was despite the introduction of double-insulated tools and requirements for portable work-site ground-fault circuit interrupters (GFCI) or equipment grounding conductor programs. The main risk in the construction industry is in plumbing where temporary or old wiring may be substandard and conditions are damp. Electrocutions from arc welding are relatively frequent in the U.S.A.

Tests by *Choice* magazine (May, 1994) showed that safety switches or earth leakage circuit breakers will not protect against all types of power fault and not all safety switches offer the same degree of protection. The fail safe test which exists in New Zealand is being considered in Australia and it offers safety in a greater range of circumstances than others. It is therefore preferable to buy a brand which passes this test. Safety switches will not prevent electrical fires, only electrification of the person.

It was reported in *Consumer* magazine (September, 1988) that, in New Zealand, non-electricians can only replace a fuse link of the rewirable or cartridge type or connect a plug, a cord extension socket, an adaptor or an appliance connector to a flexible cord (which is neither part of, nor connected to, permanent wiring). Electrical fittings such as wall sockets and light dimmers, which are readily available from retailers, are not allowed to be installed by a non-professional. Included in the article is a more detailed list of what one can do (for example, repair a fuse on a switchboard) and not do (for example, adjust the thermostat control on a hot water system). Various countermeasures are listed in the countermeasures matrix, for example, do not paint around the main power line outside your house without first calling the power board to turn off the power in the street.

In the overseas literature, there appears to be an over-emphasis on chainsaw injuries and very little emphasis on lawn mower injuries, in proportion to the frequency and severity of injury associated with these products in Australia. This is probably a partial reflection of chainsaws having been more dangerous in the past; their reputation has not kept pace with safety improvements. Also, they may be more frequently used in Europe due to the cooler climate. Lawn mowers may be more frequently used in Australia than elsewhere due to the climate and the predominance of the lawned suburban housing block.

### 3.4 DIY general information

#### 3.4.1 DIY Home Safety Kit

The DIY Home Safety Kit was produced by Queensland Health (1992) as part of the Safety at Home Series. The 70 page manual was developed to support a video produced by the Doctors Television Network (DTVN), a company which produces videos for doctors' waiting rooms. The kit, including manual and video, offers advice on safety steps to be taken with power tools, particularly power grinders, saws and drills and
welders; hand tools such as axes, knives, hammers and chisels; poisons; car maintenance; yard equipment eg. ladders, lawn mowers, trimmers and chainsaws; and naturally occurring and environmental factors eg. spiders. First aid is covered in the second section of the manual.

The manual was based on data from the Queensland Injury Surveillance Prevention Project (QISPP) and the causes of injury discussed in the manual correspond with the most frequent causes identified by the Victorian Injury Surveillance System (VISS). Mitre 10, a hardware chain, purchased two copies for each of their franchised hardware stores, and these were available for customers to borrow free of charge and were intended to be used to train sales staff. A header was also produced linking an in-store display of safety products to the DIY kit. Complimentary copies of the kit were sent to regional health authorities and an order form sent to organisations including libraries, municipal councils and Community Health Centres. There was extensive media coverage through TV stations and it was also publicised through relevant TV programs such as Gardening Australia. The kit retailed for $25.50.

The objectives of the kit were: to increase the public's belief that most DIY injuries are preventable; to provide easily understandable information on DIY safety procedures; to provide an appropriate access point for information to the DIY worker; and to train sales representatives in DIY safety issues so that they can impart this knowledge to the consumer. Extensive research had indicated a lack of appropriate and accessible information for the target group. The kit was aimed at an audience who had not been trained in DIY activities. A number of the suggested safety steps involved no cost.

An evaluation was undertaken six months after implementation. The overall results were disappointing. There were various problems in distribution eg. lack of synchronisation of availability with media coverage and a general lack of co-operation of store managers due to franchise arrangements. The individual store managers were not necessarily supportive because decisions had been made at headquarters rather than at the individual store level. Store staff, however, reported that customers were basically not interested. There was a similar reaction to other safety products eg. an attractively packaged set of painting safety products, including masks and drop sheets was heavily promoted for Father's Day and cost $12.00 but not a single set was sold. Other instructional videos promoting certain products had been made available for loan by Mitre 10 Head Office but there was very little uptake by customers. The DIY video partly lost its significance because it was seen as just one of many promotional videos. People preferred Mitre 10 staff telling them what to do rather than taking the time to watch instructional videos.

It appears that the kit is more useful in training programs. The Queensland Building Authority use it as part of their accreditation course and Woodside Offshore Petroleum Pty. Ltd purchased copies to use in their 'Off-the-Job' safety training programs.

3.4.2 Esso Home Safety Kit

The Home Safety Kit which included a scientific background paper and slides or overheads was produced by the Monash University Accident Research Centre for Esso in 1993. The demand for this resource has been small, possibly because it was ahead of its time and companies that were interested in home safety had already developed their own resources. An evaluation form was included in the kit but none have been returned and there was no funding for follow up. For the same reason the occupational health and safety area has not been fully targeted eg. by advertising in Workwords, a Victorian Health & Safety Organisation publication.

3.4.3 The Consumer Safety Institute (Amsterdam)

In an Institute report Venema (1991) defined DIY activities as those which could have been done by a professional craftsman. She referred to an increasing amount of money, although not necessarily time, being spent on DIY products. She reported that DIY emergency department presentations in The Netherlands were decreasing. She recommended that the Consumer Safety Institute's priorities for prevention should be: DIY tools, especially hand operated ones and Stanley knives; accidents involving vehicles; accidents involving cutting or piercing objects; and accidents which led to hand or eye injuries. Males aged
20-40 years were most at risk. Product, environmental and behavioural factors played important roles in DIY injury causation.

In a second article on hand tools, Venema (1993) described hobby-knives, hammers, hand-saws and chisels as most often involved in the 12,000 Dutch hand tool injuries reported in the PORS (Dutch) injury surveillance system. Cutting and piercing of hands or fingers were most common except when hammers and gardening implements were involved. She recommended stimulation of current developments in ergonomic design and education of consumers by manufacturers and retailers. The author did not find DIY or hand tool injuries to be severe relative to many other injury types.

A London study by Hayward (1993) measured the exposure to risk of injury from home and leisure consumer products. The overall measure of risk that was used in the study was the number of hospital-treated injuries per hour that the product was in use. The highest ranked products were powered cutting equipment (particularly electrically powered), access equipment (ladders and scaffolding), sharp blades (knives, saws, chisels and axes), welding equipment and jacks.

### 3.4.4 Magazines and books available for the general public

*Australian Handyman*, a bimonthly magazine published by Morabridge Pty Ltd, has some information on safety. *Our House*, another magazine which is based on the TV program of that name, had a six page segment on DIY safety in the second volume, issue number 2. It covered topics such as power tools, hand tools, paint, chemicals, roof work, ladders, electrical safety, lead-based paint and back care.

Other sources of information are the books *'Australian Home Handyman Manual'* published by Penguin Books, the Better Homes and Gardens *Do-It-Yourself Manual* published by the Book Company and The Readers Digest *Complete Guide to Home Improvements 1988 and 1990*. These have some information on safety but the emphasis in the books is instructional.

### 3.4.5 Hiring firms

In a consumer association study undertaken in the U.K. (*Which?* February 1991), the condition of circular saws and wallpaper strippers hired out and safety advice offered by hire shops was found to be inadequate, and in some cases non-existent. This situation was confirmed by 500 *Which?* readers, only one in five of whom was given advice on safety gear needed and half of whom were given no verbal advice on choosing and using hire equipment. The most common failings with circular saws were lack of proper safety instructions or warnings on the saw and main switches without lock-offs.

None of the circular saws in the U.K study were supplied with any protective gear. It is the hire operator's responsibility to hire out equipment which is fit for the purpose and safe. While most of the tools hired did the job, they were often not as safe as they could be, and in some cases potentially dangerous. Some criticisms could be put down to poor product design by the manufacturer - a lack of safety features for instance - but in many cases, the faults were due to a lack of maintenance or attention to detail by the operator. The *Which?* writers noted that all hired tools should come with instructions and advice should be offered on choosing and using equipment, including a demonstration if needed. Investigation is required into the situation in Australia in regard to the safety of equipment which is hired, and the availability of protective equipment.

A cheap source of DIY equipment (for those who qualify) is the equipment loan schemes on some Victorian university campuses. Protective equipment is not always available at these sources. The lenders take 'on good faith' the word of the borrowers on whether they are competent at using the equipment.

### 3.4.6 Other

There are emerging activities in the DIY area which need to be monitored. An interesting development is DIY clinics offered by at least one chain of hardware retail warehouses; one of their clinic topics is 'How to make your home safe'. Another innovation is videos produced for hardware shops on particular products and distributed by the manufacturer. There is also at least one company which produces safety videos and inter-active computer programs for industry.
3.5 Legislative requirements

The Health and Safety Organisation's Library in Melbourne contains voluminous material on safe work practices, especially for welding, codes of practice and standards. However no material could be found on transferring these safe work practices to the home.

The Code of Practice for Plant and Occupational Health and Safety (Plant) Regulations 1995 has recently come into effect in Victoria. 'Codes of Practice' under the Occupational Health & Safety Act 1985 are 'for the purpose of providing practical guidance to employers, self-employed people, employees, occupiers, designers, manufacturers, importers, suppliers etc on how they can meet the requirements of the Act'. The objectives of the Act are to protect people at work against risks to health or safety arising from plant and systems of work associated with plant. There is some union concern, as expressed in 'Our Voice', the Public Service Union Group Report July/August 1995, that equipment safety laws have been downgraded since there is now no requirement in Victoria to comply with Australian design and maintenance standards and no requirement for government inspection of equipment before use.

In these new Plant regulations the onus lies with the manufacturer to provide safe products. This may improve the safety level of products on the market and lead to a reduction by these means of DIY injuries (Code of Practice for Plant and Occupational Health and Safety (Plant) Regulations 1995).

The Equipment (Public Safety) Act 1994 and the Equipment (Public Safety) (General) Regulations 1995 mirror this Act and Regulations for the home and for public places and are probably more relevant to this review.

'Plant' as defined in the regulations covers items such as lifts, cranes, pressure equipment, machinery, hoists, powered mobile plant, scaffolds etc. 'Plant' does not cover road vehicles, hand-held plant and plant which relies exclusively on manual power for its operation. Equipment used by do-it-yourselfers does not always fall within the definition of plant. For example, tractors, backhoes, bench grinders, welding equipment and bench power saws are defined as plant but chainsaws, hammers, cars, angle grinders, knives, ladders, vehicle parts, power saws, hatchets and axes are not. There are still some grey areas that are yet to be defined eg. trucks (Code of Practice for Plant and Occupational Health and Safety (Plant) Regulations 1995).

The implications of these new Acts and regulations and similar legislative requirements in other states for DIY injury prevention need to be further investigated.

Australian Standards produces a booklet 'A List of Australian Standards. Occupational Health and Safety, a list of standard titles.' Fuller descriptions are in the Standards catalogue. A list of all standards relevant to DIY extracted from this catalogue is included in appendix 1.

An observation on the British experience made in a Which? magazine is relevant here. The U.K. Consumer Protection Act of 1987 has put the responsibility for supplying safe goods on the manufacturer. It is up to the manufacturer to prove that the equipment is safe rather than the victim having to prove it is not. Unfortunately British and European Standards take many years to develop so that the standards that are eventually produced lag considerably behind recent developments in safety design. Standards committees are dominated by manufacturers who often oppose changes which would improve safety by such tactics as delaying a British standard claiming that the committee should await finalisation of a European and then an international standard. The authors recommend that standards organisations speed up the process.

The Health & Safety Organisation (Victoria) has produced a booklet, 'Personal Protective Clothing and Equipment' (PPCE). One chapter is titled 'How can we make sure PPCE is used?'. In this chapter, the authors state that if employees are aware of the hazards, understand the need for PPCE, and are confident that the particular items of clothing and equipment will protect them, non-use should not be a problem. Regulations, Codes of Practice and Australian Standards set out requirements and guidelines for using personal protective clothing and equipment. Australian Standards are often referred to within regulations and codes of practice for the technical details of selecting, maintaining and repairing items of PPCE. Australian Standards also provide more detailed information on design, selection and use of PPCE. (OH&SA, 1992).
Chapter 4 –
Consultations with industry

4.1 Introduction

4.1.1 Current situation

In discussions with industry, DIY injury prevention was considered within the broader context of 'off-the-job' safety since this was how industry regarded the concept. There was acknowledgment by the Alcoa OH&S officer that at Alcoa off-the-job injuries resulted in more worker absences than on-the-job injuries. However, it was generally considered that, due to legislative requirements, priority had to be given to safety in the workplace. Most companies felt they had to get workplace injuries to an acceptable level before they moved onto off-the-job injury prevention. They believed the latter would be given much higher priority in a few years time. A recent factor that could delay action was the new Hazard ID audits which had to be undertaken in connection with the Regulations and Codes of Practice for Plant. These audits would demand available resources.

There is obviously a difference between the extent to which large and small employers can provide off-the-job injury prevention activities. Workplaces that employed at least one occupational health and safety (OH&S) staff member were more likely to provide such activities. This staff member often provided a focus and was an initiator of activities. Not all larger companies believe they had the staff numbers to justify providing an OH&S position. Clearly, small businesses cannot provide such a position, though some may employ a consultant. No evidence of co-operation between small businesses to provide off-the-job safety services to staff was found. The activities of some companies were more relevant to DIY activities than others e.g. a manufacturing or construction company is more likely to own tools, protective gear and have technical 'knowhow'. Company structures influenced how off-the-job safety information was passed on to the employee. Companies with flat hierarchies were more likely to rely on education and activities provided by OH&S staff. Companies which placed safety among the responsibilities of line managers depended on the line manager receiving, passing on and acting on the safety information.

4.1.2 Off-the-job programs

A small number of large companies, typically with headquarters in the USA, have embraced the concept of off-the-job safety. Such companies have a multifaceted approach to reducing off-the-job injury. They stressed in a variety of ways that safety should extend beyond the workplace and that part of being a good company employee or a good citizen is to incorporate this concern for safety into life off-the-job. Other companies believed that this was their eventual objective but that the initial emphasis should be on showing that the company cares about workers' health and safety, rather than the more direct approach which could be viewed as an intrusion into the private lives of employees.

One of the international companies that embraced the concept was required by their head office to provide details of off-the-job injuries resulting in worker absences. These were collated and distributed monthly within regions with 'case by case' details and a quarterly summary was circulated to all plants. Other companies questioned the accuracy of such data and the intrusion into the workers' private domain.

4.1.3 Common practices

Although many companies did not report that they were actively promoting off-the-job safety, there were some activities which contributed to off-the-job safety which were, in fact, commonly pursued. These included approval to borrow safety equipment and tools, with the consent of the supervisor. Also, employees were often allowed to undertake private work in the company workshop after hours if they were technically competent. This meant that workers were more likely to use the tool appropriate to the task and to be better protected while undertaking a DIY task. However, there was some concern about the legal consequences of these practices.
A relaxed attitude to protective equipment 'disappearing' was also common although there were limits if the equipment was expensive or there appeared to be abuse eg. different size boots being ordered by the one worker. Social clubs frequently purchased large quantities of fire extinguishers, smoke detectors and first aid kits and sold them to members at discount prices or gave them away as prizes eg. safety colouring competition for children ('spot the hazards'). In one case members were entitled to a 40% discount at a hardware chain.

4.1.4 Other off-the-job safety activities

Other less common activities which were mainly undertaken by the two most active companies were:

- a Home, Health and Safety Committee made up of OH&S and other employees and interested spouses which organised safety activities.
- annual open days with themes such as fire prevention and first aid with an emphasis on hands-on experience which included activities for all the family.
- a newsletter which incorporated off-the-job safety information and was distributed to all company employees (safety aids may be sent with these newsletters eg. hot water sensors).
- safety materials which could be shared with other sites or companies eg. manuals on off-the-job safety training.
- cards on safety procedures stressing the 'do's and don'ts' of handling various tools made available to employees around the plant.
- power plug checkers, home safety video loan schemes and home equipment safety checks (but not repairs) available through the tool store.
- monthly safety activities for the entire plant organised in turn by the various work groups, initially with the assistance of the OH&S manager.
- safety information (on and off the job) made available to line managers for distribution as they see fit.
- use of pay packets to distribute information from a Safety and Health manual.
- seminars which raise awareness of off-the-job safety – topics covered by one company were trips and falls, ladders, chainsaws, lawn mowers, eye protection for grinding and welding.
- first-aid courses during work time which also focused on off-the-job injury prevention.

An additional concern which emerged from the consultations was the safety implications of working from home eg. the possibility of fire from electrical equipment. Although this is only peripheral to the topic of this study it is likely to become more of an issue in the future when working from home becomes more common. There are legal liability issues that need to be addressed. The trend towards working from home enhances the importance of developing policy around safe work practices in the home and taking a holistic approach to occupational safety.

4.2 Other industry related consultations

4.2.1 Safety Institute of Australia

Discussions with the Safety Institute of Australia, a group for Health and Safety professionals, indicated that there has been very little evaluation of off-the-job safety programs. Also, companies with off-the-job programs tend to be those with good occupational health & safety programs. The problem is the small and medium companies which are not so well resourced and for whom on-the-job safety is the priority. What is being done is as much for morale and goodwill reasons as for reducing injuries. There has been very little follow-up to monitor the effects of programs.

4.2.2 VicHealth

The VicHealth Partnerships in Industry Program runs monthly seminars on topics such as 'Managing a Culturally Diverse Workplace', 'Cancer and heart disease in the workplace', 'Organisational stress', 'Rosters and Shift work'. Companies pay an annual subscription to be a partner and have free places at these seminars. The purpose is to pick up leading edge ideas and implement them in the workplace. VicHealth has not provided a seminar on off-the-job injury prevention yet this topic is one which has a potential for reducing costs by impacting on worker absences. According to the Alcoa OH&S officer, off-the-job injuries are a more frequent cause
of worker absences than on-the-job injuries at Alcoa, yet industry is directing its resources to the latter.

4.2.3 Health & Safety Organisation (Victoria)

The purpose of this state government organisation is to enforce Occupational Health and Safety regulations in Victoria and its targets are based on statistics on injuries in the workplace. Statistics from the state insurance organisation, Workcover, also cover on-the-job injuries including travel to and from the workplace. Neither organisation takes responsibility for DIY injuries.

However, the impact of the new Occupational Health and Safety (Plant) Regulations and the Equipment Public Safety Act on DIY injuries requires investigation. These Acts are administered by the HSO (Victoria). The safety practices of persons working at home is of relevance here (see appendix 3).

4.2.4 'Share' Program

'Share' is an information program conducted by the Health and Safety Organisation (Victoria). It provides a manual of 291 solutions to common health and safety hazards which is updated regularly. The solutions are divided into 6 categories: manual handling; airborne contaminants; machine guarding; noise; slips, trips and falls; and policies and procedures. Each solution includes details of the information provider, costs and target workplace or industry type. The Alcoa home safety newsletter was included in the latest update and there is potential for including recommendations from this project.

4.2.5 Off-the-job safety, industry and the community

Another means by which industry encourages off-the-job safety is by sponsoring community safety projects. Fort McMurray in Alberta, Canada, which is essentially a two company town, is a particularly good example of this. Community safety audits are undertaken by both companies. These not only concentrate on making the physical environment safer but also peoples' activities eg. car pooling for pub visits. The companies supply expert officers to audit teams and pay the costs of the pamphlets for the audits.

Industry also sponsors a community safety newsletter and Safetysaurus, a dinosaur who moves around the neighbourhood wearing safety gear. In addition they sponsor an occupational health and safety centre which has information on off-the-job safety. A multi-intervention approach is used to create a 'culture of safety' ie. the idea that worksafe practices should be implemented beyond the workplace. Finally, industry and community emergency services are integrated and all interconnect (Latrobe Better Health Program – Henk Harberts, personal communication).

There are several examples of sponsorship of injury prevention in Victoria by national and state companies. The Gas and Fuel Corporation has funded the Child Safety Centre at the Royal Children's Hospital, Melbourne and a research project in the Burns Unit at the Royal Children's Hospital. Esso has provided financial support to the Safety Centre for the printing of a safety discussion set for schools. Hebdem's Bathrooms and Classic Kitchens have donated a bathroom and kitchen respectively to the Centre. Kidsafe (Victoria) has received funding from United Energy and Easy Music 3MP for radio advertisements, the NRMA has sponsored their Early Childhood Injury Prevention Program (ECIPP) and the Plumbers, Gasfitters and Drainers Regulation Board have provided temperature cards for the 'Hot Water Burns Like Fire' Campaign. MUARC received sponsorship for their Esso Home Safety Kit and to develop educational material for childhood poisoning prevention. There are a number of examples from the Safe Living Program in the former Shire of Bulla, including Mitsubishi Motors providing a motor vehicle for 2 years, DFS Health Insurance providing the Program with letterhead and 6000 fridge magnets and Envirogard paying for printing. Additional sponsors for this project were Sunbury Paint Centre, Sunbury Physiotherapy Centre, Program 21 and MBF Australia. There are no doubt numerous other examples of current and past industry sponsorship for community-based interventions.

4.3 Countermeasures

Countermeasures have been selected from the formal and informal literature, industry and ergonomic consultations, and standards, or devised
from first principles by the authors based on their analysis of the chain of events leading to injury. They target high frequency and/or high severity injuries. These are outlined in Table 2 and grouped according to whether they refer to design, protective equipment, regulations or work practices. Although extensive, the list does not cover all possible countermeasures. Where possible the selection of countermeasures is based on evaluation or biomechanical studies. Others are based on Haddon's strategies (Robertson, 1983), Australian or overseas standards or on the scientific principles of injury prevention.
### 4.3.1 Table 2: Countermeasures

<table>
<thead>
<tr>
<th>Factors</th>
<th>Countermeasures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grinders</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Protective equipment | • wearing protective eyewear that  
|                    | - fully covers the eyes  
|                    | - fits comfortably  
|                    | - doesn’t fog up  
|                    | - doesn’t allow penetration of fine particles  
| Work practices   | • wearing gloves  
| | • keeping guard in place when bench grinder is in operation  
| | • keeping eyewear and guard clean during operation |
| **Lawn mowers**|                                                                                                                                                  |
| Design         | • Design modifications to deflect objects downwards  
| | • Automatic turnoff if mower is left unattended  
| Regulations    | • Implementation of mandatory safety standards to ensure all mowers meet with the Australian Standard  
| Protective equipment | • Wearing eye protection, boots, gloves and ear muffs, non-wearing of thongs or bare feet  
| Work practices | • Visual inspection of the mower prior to use to check for wear or damage  
| | • Ensuring that the area to be mowed is free of debris  
| | • Not allowing children to play in the area that is being mowed  
| | • Adding fuel before starting the motor  
| | • Turning the mower off if leaving it unattended  
| | • Never pulling the mower back towards the operator  
| | • Never picking up, turning over or carrying the mower while it is in operation |
| **Ladders**    |                                                                                                                                                  |
| Work practices | • Following instructions on ladder, particularly in reference to load limits and maintenance  
| | • Not climbing higher than the third rung from the top  
| | • Improving the security of the base of the ladder to prevent the ladder slipping  
| | • Frequently repositioning the ladder so that stretching is not required - the limit of movement should be 1/2 metre from the shoulder  
| | • Making sure that step ladders and trestle ladders are fully spread and locked with all four legs resting on a secure, level base  
| | • Ensuring the stability of a single extension ladder by obtaining the correct angle, which is 1/4 to 3/8 of the length of the ladder out from the wall or line of the upper resting point  
| | • Placing the head of a single extension ladder against a firm support, on which both stiles can rest evenly, and wherever possible lashing the ladder to a suitable support at the top to prevent the ladder from sliding or falling over  
| | • Ensuring that the area around the base of the ladder is stable and free from obstacles  
| | • Arranging for another person to be available to prevent interference when persons or vehicles are close by  
| | • Never placing ladders on an unstable base to obtain extra height  
| | • Wearing non-slip footwear |
| **Vehicle parts** |                                                                                                                                                  |
| Regulations    | • Requirement for safety radiator caps in Australian Design Regulations for motor vehicles  
| Work practices | • Using correct methods and devices to remove radiator caps to prevent scalding  
| | eg. a magnetic deflector  
| **Welding**    |                                                                                                                                                  |
| Protective equipment | • Wearing eye protection in accordance with AS1358  
| | • Wearing face shield if there is a chance of splatter  
| | • Wearing protective clothing to minimise the risk of skin damage  
| | eg. flame resistant gloves and safety shoes  

Prevention of Injuries associated with Do-It-Yourself Activities
4.3.1 Table 2: Countermeasures continued

<table>
<thead>
<tr>
<th>Factors</th>
<th>Countermeasures</th>
</tr>
</thead>
</table>
| **Nails, screws**| * Wearing shoes with nail resistant soles  
Protective equipment

| **Knives**       | * Wearing gloves  
Using a knife appropriate to the purpose  
Ensuring that knives are sharp so that excessive force doesn't need to be used  
Covering with sheaths when not in use  
Having a preference for retractable blades  
Protective equipment  
Work practices

| **Power saws**   | * Using adequate eye protection, including a face or dust mask if the job is messy  
Making all adjustments before switching the saw on and making sure all adjustment levers are tight  
Clamping the timber to a stable support, but not in a way that it interferes with the operation of the saw  
Using riving knives where fitted  
Knowing how to avoid kickback, and if it occurs releasing the trigger switch immediately  
Standing clear of line of cut  
Keeping hands away from blades  
Keeping blades sharp and clean  
Not using blades with incorrect sized holes  
Protective equipment  
Work practices

| **Hammers**      | * Wearing safety goggles by the user and observers in the vicinity  
Keeping hands away from point of contact when using maximum force  
Using a hammer appropriate to the purpose eg. a soft mallet of lead, rubber or plastic when a hammer is to be used on hardened steel or stone  
Keeping hammers in good and clean condition  
Choosing a hammer with a striking face diameter approximately 2.54cm larger than the face of the tool being struck  
Looking behind before striking a hammer  
Not striking with the side or the cheek of the hammer and avoiding 'glancing' or off-centre blows which may cause metal chips to fly into the air  
Never using a hammer with a loose or damaged handle  
Protective equipment  
Work practices

| **Hatchets, axes**| * Wearing workboots, preferably steel-capped, and safety goggles  
Ensuring that the head of the axe is fixed firmly to the handle and that the handle and head are kept in good condition  
Using two hands, or, if this is not possible, wearing gloves  
Protective equipment  
Work practices

| **Chainsaws**    | * Ensuring that the chainsaw has a chainbreak, preferably automatic, to prevent kickback  
Wearing protective equipment as outlined in AS 2727-1984  
Following safe work practices and inspecting the chainsaw prior to starting, ensuring the guide bar is tight and the chain fits snugly without binding  
Holding the saw firmly on the ground with the chain pointing away from your body when starting it and using a quick sharp motion on the starter cord  
Never ‘drop starting’ the chainsaw, ie. starting it in your hands, or making any adjustments to the chain or guide bar whilst the motor is running  
Operating the chainsaw in a firm two-handed grip with fingers and thumbs surrounding the handle  
Maintaining full power throughout each cut  
Keeping the saw clean and free of sawdust, dirt and oil  
Never leaving a saw running unattended or carrying it while it is running  
Design  
Protective equipment  
Work practices

Prevention of Injuries associated with Do-It-Yourself Activities
<table>
<thead>
<tr>
<th>Factors</th>
<th>Countermeasures</th>
</tr>
</thead>
</table>
| **Hoists, lifts, jacks**  | • Checking the vehicle handbook for positioning of the jack  
• Not getting under a vehicle that is jacked up unless correctly supported on a chassis stand  
• Using drive-on ramps in preference to jacks  
• Ensuring the jack is good quality, regularly oiled and maintained  
• Chocking the wheels and applying the handbrake to prevent the car rolling |
| Work practices            |                                                                                                                                               |
| **Circular saws**         | • Wearing eye protection to avoid flying sawdust  
• Wearing respirators when exposed to possibly harmful dusts  
• Frequent inspections and a rigid maintenance schedule  
• Not using the saw on an unsupported plank, always securing work to avoid movement  
• Keeping the work area clean and dry  
• Raising or lowering the blade so its teeth just protrude through the bottom of the wood  
• Using a tool of the correct size  
• Allowing the saw to attain full power before cutting  
• Ensuring the retracting lower blade guard is fully returned before laying the saw down, never fixing this guard in the open position  
• Disconnecting the power supply before adjusting or changing the blade  
• Using two hands to operate the saw; one on the trigger switch, the other on the front or side for stability  
• Never forcing the saw at any time during cutting  
• Not cutting materials without first checking for obstructions or foreign objects such as nails or screws  
• Not overreaching, keeping proper footing and balance at all times  
• Ensuring that portable electric handsaws are grounded to prevent electrocution if an electrical defect occurs  
• Ensuring that the motor is free from an accumulation of dust, chips or excess grease  
• Not carrying the saw with the finger on the trigger switch, especially while the cord is connected |
| Protective equipment      |                                                                                                                                               |
| Work practices            |                                                                                                                                               |
| **Tractors**              | • Approved roll over protection structures on all tractors  
• Guards on power take-off shafts  
• Safe access platform  
• Skills training  
• Wearing seat belts  
• Allowing no passengers |
| Design                    |                                                                                                                                               |
| Work practices            |                                                                                                                                               |
| **Electrocutions**        | • Requiring work-site Ground Floor Circuit Interrupters or equipment grounding  
• Installing earth leakage circuit breakers (safety switches) which reduce the chances of injury from shock when something goes wrong with portable electric equipment. (installation of brands that have passed the ‘fail safe’ test, but having no expectation that they protect against fire)  
• Never attempting electrical activities which are illegal or beyond the competence of the people involved  
• Turning off the power when attempting repairs eg. changing a fuse  
• Using an isolating transformer when operating equipment outside  
• Ensuring that tools are double insulated  
• Having the wiring checked when buying a home |
| Work practices            |                                                                                                                                               |
| Other                     |                                                                                                                                               |
Chapter 5 – Discussion and recommendations

5.1 Discussion

5.1.1 Major risk groups and products involved

This report identifies and ranks the major causes of DIY injuries both from Australian databases and from the published literature. It demonstrates that DIY injury is substantial and largely preventable.

The age group most at risk for DIY injury was found to be adults below the age of 55 years, and 85% of all cases were male. In rank order, major products and activities associated with DIY injury were: grinders, lawn mowers, ladders, vehicle parts and welding (based on VISS emergency department presentations data); ladders, lawn mowers, power saws, circular saws and vehicle parts (based on VISS hospital admissions data); and electrical equipment, ladders, tractors, backhoes and trees (based on Victorian fatalities data). This generally concurs with the rankings in a Norwegian study of hobby and garden tool injuries based on data in the National Institute of Public Health's Injury Surveillance System which were: knife, ladder, handsaw and unspecified saw, angle grinder, axe and lawn mower. (Lund and Olsen, 1994).

Clearly, the age and sex distribution of DIY injury indicates that victims are mostly in the workforce. The only group for whom the employment status is known is for deaths. Of the 44 DIY deaths 26 (59%) were employed.

5.1.2 Indirect benefits

Others that could benefit from the implementation of workplace off-the-job safety programs (including DIY safety) are bystanders, particularly children, and older family members. Indirect benefits for older family members may include: home maintenance tasks being undertaken by their adult children (the latter having learnt through safety education that it may be inadvisable for their older family members to attempt certain tasks eg. climb ladders); and subsidised or cost price safety equipment such as smoke detectors being supplied through workplace programs accessed by their adult children.

5.1.3 Outcomes

This report comprehensively documents available countermeasures derived from the formal and informal literature, industry and other professional consultations and from first principles.

Further, based on consultation with industry and related sources together with the relevant literature, this report reviews current practice and outlines the scope for the transfer of safe work practices to the home, and complementary strategies.

5.1.4 Future directions

The next stages to achieving injury reduction are to develop priorities and targets, implement strategies, and establish monitoring and review processes. Integral to this is the identification of the appropriate infrastructure to drive, fund, monitor and sustain the process and a lead agency to co-ordinate implementation of the recommendations.

The current status of the ICD9 CM coding system, where few products and activities relevant to DIY injuries can be specifically identified, limits the opportunities for setting targets for injury reductions. Morbidity reduction targets could be set in most States for injuries relating to lawn-mowers, powered hand tools, woodworking and electrocution. Trend analyses over several years could inform the setting of realistic targets.

This chapter outlines the many implementation strategies from which choices could be made. These strategies focus on workplace initiatives, education, regulation, research, policy and ways to overcome economic barriers. Since few countermeasures or implementation strategies have been formally evaluated, it may be appropriate to undertake pilot studies before widespread implementation. Ideally,
controlled trials of implementation should be conducted, though these would be difficult to undertake, or justify, for relatively low frequency injury problems.

The 'culture of safety' clearly needs to be enhanced so that consumers buy with safety in mind. Their purchasing decisions will then encourage manufacturers, importers and retailers to provide safer tools and equipment. This is an important focus in the strategies set out below.

The chapter concludes with a series of recommendations for the next steps in a systematic approach to DIY injury prevention. The direct transfer of workplace safety is only one of a number of promising strategies or interventions. The recommendations also include infrastructure and research needs.

5.2 Strategies

5.2.1 Workplace

1. Allow and encourage protective equipment to be borrowed from the workplace – either equipment normally used by the worker or through a tool library/workshop.

2. Allow and encourage tools to be borrowed from the workplace – either the tools normally used by the worker or made available through a tool library/workshop. This would encourage the do-it-yourselfer to use the equipment most appropriate to the purpose, would save the workers money and give access to equipment which is more likely to be of better quality and have up-to-date safety features (a potential disadvantage is that this policy may encourage workers to 'have a go' when a job is best left to experts).

3. Offer training in the use of the borrowed equipment. The possibility of legal liability in the event of injury should be investigated. Other than greater wear and tear and keeping track of the equipment there do not seem to be disadvantages with this system. It may overcome the problem of tool pilfering.

The risk posed by 'formalising' already existing informal arrangements should be investigated.

4. Offer free home appliance safety checks in the workplace.

5.2.2 Education

5. Institute public education/establish a 'culture of safety' which encourages:

- use of safety features;
- use of protective equipment;
- reading and following instructions;
- clearing of surrounding areas, removing bystanders or supplying them with protective equipment before starting a DIY job;
- high risk groups to avoid dangerous DIY activities (eg. use of ladders by older men); and
- regular maintenance and checks that the equipment is safe (eg. during Safety Week there could be various locations where home equipment is tested for safety).

6. Further develop existing educational materials (eg. Queensland Health Do-It-Yourself kit and include DIY information with the safety material. Seek the assistance of market research and marketing companies in distributing this product.

7. Explore the potential development and use of alternative information distribution mechanisms such as the provision of single issue DIY safety information cards or pamphlets at points of sale/hire of DIY equipment.

8. Seek the media's co-operation in disseminating the findings and recommendations of this report by means of a press release, and possibly the development of industry/occupational safety authority sponsored commercials.

9. Provide incentives to manufacturers, retailers and safety organisations to publicise the safety features on power tools.

10. Undertake further discussions about potential off-the-job safety interventions, particularly with representatives of small and medium sized companies, employer organisations and unions. There could be potential to organise information sessions through commercial and professional organisations such as the National Safety Council or the Safety Institute of Australia.
11. Negotiate with the Victorian Health Promotion Foundation to present relevant findings from this study to a Partners in Industry seminar, which could serve as a model for similar presentations elsewhere.

5.2.3 Regulation

12. Examine the role of standards organisations and government in providing up to date horizontal and performance standards for high risk DIY tools and equipment, and facilitate market advantages for products conforming to these standards. The standards should be based on current developments in ergonomics and design.

5.2.4 Research

13. Improve the coding system within the ICD9 CM 'mechanism of injury' (E-codes) codes to specifically identify types of equipment that frequently cause serious injury eg. circular saws, and to separately code irrelevant categories currently included in hand tools coding (eg. pins and needles).

14. Complement information derived from Coronial inquests with injury surveillance data, especially for the types of injuries where the number of fatalities are low.

15. Undertake a study of the safety performance of second-hand and hired DIY equipment and of advice given at the point of hire.

16. Investigate the implications of the new Code of Practice for Plant, the Occupational Health and Safety (Plant) Regulations 1995, the Equipment (Public Safety) Act 1994 and the Equipment (Public Safety) (General) Regulations 1995 to see whether they apply to DIY equipment and activities.

17. Inform intervention decisions and targeting by undertaking exposure studies to determine participation rates for DIY activities, the age of equipment used, the rate of use of protective equipment and other relevant information, and hence identify the most risky activities.

18. Investigate means of ensuring equipment users read and apply instructions eg. adhere brightly coloured simple instructions to the equipment which emphasises that if people do not read these instructions they may damage equipment or injure themselves. Some research suggests that it is mainly the inexperienced user who reads instructions.

19. Improve the designs of protective equipment to make it more effective, comfortable and acceptable.

20. Improve the intrinsic safety features of the products eg. a quicker reaction time for guards on circular saws. Inform people of the variety of safety features available on equipment. An aim should be to prevent users being able to disengage safety equipment eg. taping the 'on' button on circular saws thus enabling one handed operation and flicking back shields on grinders. Safety features should not cause other hazards and this appears to be a common complaint about current equipment.

21. Investigate hand protection including documenting effective gloves for particular situations eg. chemical and heat handling.

22. Commission follow-up studies of common injuries where the chain of events is not clear.

23. Examine the extent of DIY deaths from the national study of fatalities undertaken by Worksafe Australia in 1995 (data not yet available).

24. Examine opportunities for injury prevention where work-related injuries have declined but DIY injuries have not eg. powered hand tools.

5.2.5 Policy


25. Establish a clearing house and advice centre on DIY activities with special emphasis on safety. This could be developed within an existing advice service such as that offered by the Master Builders' Association or within a broader product safety advice centre.

26. Implement a Product Safety Directive similar to that implemented in the European
Community, which requires all new and used products, which are placed on or offered to the market, to be safe. This would be more comprehensive than the Code of Practice for Plant and the Equipment (Public Safety) Act (Part 2).

27. Businesses which hire equipment should make safety gear inclusive in the hiring price and give some training. It should be promoted as a plus to hire from companies that offer this service.

5.2.6 Economic barriers

28. Investigate the removal of economic barriers to safety:

• Improve access to low cost home maintenance eg. expansion of local government home handy person services, service clubs.

• Introduce subsidies for safety equipment eg. the Shire of Bulla (Victoria) introduced a $5 subsidy on smoke detectors.

• Reduce cost of repairs to worn or faulty equipment.

• Improve availability of equipment so that the equipment appropriate to the purpose can be used eg. establish local government tool libraries.

• Reduce cost of upgrading equipment. The later models are more likely to have improved safety features eg. chain saws and inertia chain brakes, motor vehicle bonnets held up by gas struts rather than rods.

5.3 Recommendations

The recommendations outlined below are suggested priorities for action which aim to address the infrastructure and information needs and to guide the implementation of already available interventions. Each of these actions could be initiated immediately. Where appropriate the common benefits of integrating workplace safety, home safety and consumer product safety should be emphasised when seeking support for action on recommendations and strategies.

5.3.1 Identify a lead agency and source of funding

5.3.2 Commission a follow-up research study to determine the extent to which DIY injuries relate to particular industry groupings to establish whether:

• a direct transfer of safe work practices to the home is appropriate since this would be largely dependent on whether the persons at most risk of DIY injuries are those who undertake similar activities in the workplace;

• an indirect role for workplaces is appropriate whereby off-the-job safety is targeted at workers from any industrial grouping in order to reduce worker absences as the result of DIY and other injuries;

• small business networks are appropriate and feasible agents for intervention;

• it is feasible for workplace safety strategies to be delivered to the community by alternative methods;

• a combination of the above strategies is appropriate; and

• the workplace presents low-cost opportunities for intervention.

5.3.3 Convene a national workshop/seminar to promote the notion of off-the-job safety focussed according to the outcome of the above study (5.3.2) on occupational health and safety, professionals, corporate management and other relevant bodies. Such a workshop would be expected to raise the profile of the win/win strategy for injury prevention and industry. There are sufficient data and examples of available countermeasures and successful intervention strategies to make a one-day seminar/workshop viable.

5.3.4 Commission a study to determine attitudes to DIY injury prevention. This would assist the design of interventions and test acceptability of proposed solutions.
5.3.5 Implement intervention programs on specific issues.

Strategies for the prevention of eye injuries and hand injuries during DIY activities are set out below. These approaches could be applied to other DIY injuries.

DIY eye injury prevention strategy

Interventions:

- subsidies on the purchase or hire of eye protection;
- media promotion of the issue and of intervention programs;
- retail outlet promotions of eye protection, special sale prices, point of sale information about eye protection with grinders and other hazardous equipment, inclusion of eyewear in special deals on DIY tools;
- workplace promotions of DIY eye protection, lending of equipment; and
- draw manufacturers' attention to improved design to reduce the hazard, and to price containment for adequate protective eyewear.

Institutionalisation:

- Institutionalisation of the program would be a major aim of such a demonstration program since sustainability would be fundamental to showing a long term effect on injury rates.

Evaluation and dissemination:

- A comprehensive evaluation and widespread dissemination of the report should be seen as integral to such a demonstration program. The evaluation should focus on documenting the process, the impact of the program on protective eyewear usage and on injury outcomes, and the extent of institutionalisation.

Leadership and project management:

- Issues of identifying a lead agency for this program, funding, and establishing an advisory or management committee may best be approached by means of discussions with state health departments and local government areas with expertise in injury prevention programs.

DIY hand protection strategy

Interventions:

- documentation of effective hand protection for particular situations;
- dissemination of this information to points of sale of relevant DIY equipment, and trade and hobby associations;
- media promotion of the issue;
- retail outlet promotions of hand protection, special sale prices, point of sale information about hand protection with grinders and other hazardous equipment, inclusion of hand protection in special deals on DIY tools;
- institutionalisation of the program to achieve sustainability.

Implementation:

- A lead agency would be required to implement these interventions and to evaluate their effectiveness.

5.3.6 In order to facilitate a safer product design, establish an injury and complaints data and information clearing house for manufacturers, importers, wholesalers, retailers, consumer associations and other relevant bodies. This could be located within a Consumer Product Safety Institute or within a relevant government department or university centre.

5.3.7 Commission in-depth studies of particular agents to determine mechanisms of injury where these are not apparent from existing data sources.

5.3.8 Explore the potential for enhancement of the municipal home handyperson services at local government level and at the Commonwealth and State levels, or the development of other organised low-cost home maintenance services as an alternative to unskilled householders attempting home maintenance activities.
5.4 Monitoring interventions and their effectiveness

It is recommended that the Commonwealth Department of Human Services and Health should assume responsibility for encouraging and overseeing the implementation of the strategies and recommendations in this report and monitoring the outcomes in terms of both uptake of protective measures and DIY injury reductions.
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## Consultations

<table>
<thead>
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<th>Personal visits:</th>
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Prevention of Injuries associated with Do-It-Yourself Activities
Tide and sub-tide: Prevention of injuries associated with Do-It-Yourself activities

Authors
Routley, V; Ozanne-Smith, J

Organisation:
Monash University Accident Research Centre

Abstract:
This study aimed to examine the feasibility of piloting projects to transfer safe work practices from work to home through the identification of a set of priority issues that offer good potential for improving the safety of 'do-it-yourself' (DIY) home handyperson activities.

Data analyses were undertaken of emergency department, hospital admissions and coronial data on DIY and domestic maintenance injury. Formal and informal literature were reviewed from both Australia and overseas concerning DIY injuries and relevant prevention both in the home and workplace. Industry consultations with occupational health and safety personnel also contributed to the identification of countermeasures for the leading causes of DIY injury.

The leading causes of DIY injury were grinders, lawnmowers, ladders, vehicle parts, welding equipment, power saws, vehicle parts, electrical equipment and tractors. Males were most commonly involved in DIY injury (85% of cases) and DIY injury was over-represented in rural compared with urban data. Injuries were most frequently to eyes and hands.

The development of off-the-job safety programs is variable. Practices included the loan of safety and other DIY equipment, social clubs purchasing large quantities of safety equipment and sales to members at discount prices, the sponsorship of community safety programs and the production of safety information which may be shared with other sites and companies.

The next stages to achieve injury reduction are to identify a lead agency, develop priorities and targets, implement strategies and establish monitoring and review processes.

The direct transfer of workplace safety is only one of a number of promising strategies. The implementation strategies from which choices can be made focus on workplace initiatives, education, regulation, research, policy development and overcoming economic barriers. Countermeasures should be formally evaluated and the 'culture of safety' needs to be enhanced so that consumers buy with safety in mind. Research recommendations include a follow-up study to determine the extent to which DIY injuries relate to particular industry groupings.

Key Words:
diy, do-it-yourself, off-the-job injury, off-the-job safety, injury prevention

Disclaimer:
This report is disseminated in the interests of information exchange. The views expressed are those of the authors, and not necessarily those of Monash University nor of the Commonwealth Department of Human Services & Health

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Monash University Accident Research Centre
Wellington, Road, Clayton, Victoria, 3168 Australia

Prevention of Injuries associated with Do-It-Yourself Activities
## Appendix 1

**DIY - Related Australian Standards (from 1995 catalogue)**

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Nails, screws, bolts

Bolts
- black cup, countersunk
- coatings on
  - electroplated
  - galvanised
- cup head, metric
- eye
- for steel structures
- hexagon, commercial, metric
  - nuts for
- hexagon, precision, metric
  - nuts for
- hexagon, unified
- high strength steel
- pipes, valves and fittings
- structural
- tower
- unified black
- unified hexagon

Screws
- cap
- coach
- drive
- galvanised zinc coatings
- hexagon metric
- hexagon, unified
- machine screws and machine screw nuts
  - metric
  - self drilling for building and construction
  - set, socket, metric
  - tapping
  - unified black hexagon
  - unified hexagon
  - wood, metric

Nails
- steel

Knives
- hand-held for meat industry

Power saws
- circular, metal cutting, interchangeability
- electric

Hammers
- general requirements
- specific requirements for heavy hammers
- specific requirements for light hammers

Prevention of Injuries associated with Do-It-Yourself Activities
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jacks
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Appendix 2


DIY - Related E-code categories

Accidental Falls (E880 - E888)

Excludes: falls (in or from): burning building (E890.8, E891.8)
into fire (E890.0-E899)
into water (with submersion or drowning) (E910.0-E910.9)
machinery (in operation) (E919.0-E919.9)
in edged, pointed, or sharp object (E920.0-E920.9)
transport vehicle (E800.0-D845.9)
vehicle not elsewhere classifiable (E846-E848)

E881 Fall on or from ladders or scaffolding
E881.0 Fall from ladders

Other Accidents (E916-E928)

E919 Accidents caused by machinery

Includes: burned by,
caught in (moving part of)
collapse of
caught in or pierced by
drowning or submersion caused by
explosion of, on, in
fall from or into moving part of
fire starting in or on
mechanical suffocation caused by
object falling from, on, in motion by
overturning of
pinned under
run over by
struck by
thrown from
caught between machinery and other object
machinery accident NOS

Excludes: accidents involving machinery not in operation (E884.9, E916-E918)
injury caused by – electric current not in connection with machinery (E925.0-E925.9)
– escalator (E880.0, E918)
– explosion of pressure vessel in connection with machinery (E921.0-E921.9)
– moving sidewalk (E885)
– powered hand tools, appliances and implements
(E916-E918, E920.0-E921.9, E923.3-E926.9)
– transport vehicle accidents involving machinery (E800.0-E845.9)
– poisoning by carbon monoxide generated by machine (E868.8)
E919.4 Woodworking and forming machines
- Band saw
- Bench saw
- Circular saw
- Moulding machine
- Overhead plane

Excludes: Hand saw (E920.1)

E920 Accidents caused by cutting and piercing instruments or objects
- Includes accidental injury by: object: edged
- Fall on: pointed
- sharp

E920.0 Powered Lawn Mower

E920.1 Other powered hand tools
- Any powered hand tool (compressed air) (electric) (explosive cartridge) (hydraulic power), such as:
  - drill
  - rivet gun
  - hand saw
  - snow blower
  - hedgeclipper
  - staple gun

Excludes: band saw (E919.4), bench saw (E919.4)

E920.4 Other hand tools and implements
- Axe
- Paper cutter
- Can opener NOS
- Chisel
- Pitchfork
- Fork
- Rake
- Hand saw
- Scissors
- Hoe
- Screwdriver
- Ice pick
- Sewing machine (not powered)
- Needle
- Shovel

E925 Accidents caused by electric current
- Includes: electric current from exposed wire, faulty appliance, high voltage cable, live rail, or open electric socket as the cause of:
  - burn
  - cardiac fibrillation
  - convulsion
  - electric shock
  - electrocution
  - puncture wound
  - respiratory paralysis

Excludes: burn by heat from electrical appliance (E924.8)
- lightning (E907)

E925.0 Domestic wiring and appliances
EMPLOYEE HOME SAFETY PROGRAM PUTS FAMILY SAFETY ON THE MAP

The Point Henry division of Alcoa, well known aluminium smelting and sheet rolling plant, has a staff of 1200 and has been in operation for over thirty years. Several years ago the company’s Health and Safety Committee recognised the need for raising safety awareness outside, as well as inside, the workplace. The Committee believed that safety issues for the employee do not end at the plant’s gates. A responsible and positive attitude needed to be developed during an employee’s leisure and non-working hours and in a domestic, as well as workplace, context.

SOLUTION

In 1992 an Employee Home Safety Program was established. This program was developed in consultation with employees who helped establish the nature of activities pursued by themselves and their families after work. The Committee has incorporated health as well as safety issues in its program. A wide range of topics - from bicycle safety and skin cancer prevention to coping with personal crises and drug abuse - is covered.

Information is distributed to employees’ families in the form of a direct mailout conducted five times a year. The Committee meets once each month to decide on the theme - which may be seasonally-based - and format of the mailout. In the first instance, the Committee collects published information from established health and safety organisations (including the HSO) and community associations, for inclusion in the information pack. Thereafter, as information gaps are identified, the Alcoa Committee develops its own resource material.
Materials produced by the Committee include home user alerts to potential hazards, practical health and safety advice and educative information. Alerts include things such as a ladder 'danger tag' tied to the rungs of a user's ladder and reminding him or her of potential dangers - for example, overhead wires - when setting up the ladder. A car card is a useful reminder on how to maintain the family car or change a tyre - the latter is repeated in a sticker version for the car wheel for easy access during a puncture. Jigsaw puzzles, board games with a safety theme and brochures are also produced.

Surveys of employee's families are conducted annually to gauge how well the content of the Home Safety Program has been received and to identify new areas of concern for readers.

The solution set out above does not modify or discharge a person from any legal obligation imposed by the provision of the Occupational Health and Safety Act 1985, or any other legislation. Further, reference to any specific product, manufacturer, or brand name does not necessarily imply endorsement or approval of that product, manufacturer or brand name by the Health and Safety Organisation.
**Appendix 4**

**Victorian Injury Surveillance System**

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<td><strong>Telephone:</strong></td>
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**Injury and Poisons Form**

For all injuries and poisonings

**Complete only for FIRST attendance of a particular episode**

| Date: |     |
| Time: |     |

**GIVE AS MUCH DETAIL AS POSSIBLE**

1. **When did the injury occur?**
   - **Date:**     
   - **Time:**     

2. **Where did the injury occur?**
   - **Give exact place and suburb where injury or poisoning occurred:**
     - *(e.g., at intersection of Jones and Smith St in on the side of the road - Coburg; in the bathroom shower recess at home - Werribee)*

3. **What was the injured person doing at the time the injury occurred?**
   - *(e.g., having tea and playing around with sister; using a bench grinder; crossing road on way to school; up ladder pruning tree)*

4. **What went wrong?**
   - *(e.g., chased by dog and lost control of bike; fell off top level of ladder; hot coffee knocked over; scaffold collapsed)*

5. **What actually caused the injury?**
   - *(e.g., landed on concrete; cut hand on edge of broken toy; swallowed disinfectant and digoxin tablets; hot metal flew into eye)*

6. **Was he/she injured on the job?**
   - **Yes [ ]**
   - **No [ ]**

7. **What is the injured person's occupation?**

8. **In what sort of business is he/she employed?**

9. **If a specific product or article was involved, please give details (product, brand & model):**

10. **What safety precautions or devices were being used at the time the injury occurred?**
    - *(e.g., seat belt; infant capsule; child-resistant bottle cap; bicycle helmet; safety goggles, harness, none)*

11. **If a motor vehicle was involved, please give details:**
    - **Make & Model:**
      - *(e.g., Honda Civic)*
    - **Year**
    - **Type of vehicle**
      - *(e.g., sedan; station wagon; hatchback)*

12. **If injured in a motor vehicle, show the seating position of the injured person.**
    - CIRCLE THE APPROPRIATE NUMBER ->
    - **(e.g., driver, passenger, back seat, etc.)*

**Sometimes additional information is needed for injury prevention. If you do not wish to be contacted, please place an X here.**

**IMPORTANT: PLEASE HAND THIS SHEET TO THE DOCTOR WHEN YOU ARE SEEN**

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**SPECIAL PROJECTS**

Prevention of Injuries associated with Do-It-Yourself Activities

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*Form YESS 9/2*  
*May 1993*
Injury Summary

Complete only for first attendance of a particular episode

### 1. Nature of the Injury

- **Severity**:
  - 1: Severe
  - 2: Moderate
  - 3: Mild

- **Body Part**: Select up to three codes

  - **Head**:
    - 101 Eye
    - 102 Ocular/Adnexa
    - 103 Nose
    - 104 Mouth External, e.g. jaw, lip
    - 105 Ear
    - 106 Face/Check/Forehead/Scalp
    - 107 Skull Base
    - 108 Skull Vault
    - 109 Neck, NEC
    - 198 Other Injury to Head

  - **Upper Extremity**:  
    - 201 Clavicle
    - 202 Scapula
    - 203 Shoulder, NEC
    - 204 Humerus
    - 205 Upper Arm, NEC
    - 206 Radius, Ulna
    - 207 Elbow
    - 208 Forearm
    - 209 Wrist
    - 210 Carpal Bone
    - 211 Metacarpal Bone
    - 212 Digit/Phalanx
    - 213 Hand, NEC
    - 298 Other Injury to Upper Extremity

  - **Lower Extremity**:  
    - 301 Hip
    - 302 Femur
    - 303 Upper Leg, NEC
    - 304 Knee
    - 305 Tibia/Fibula
    - 306 Lower Leg, NEC
    - 307 Ankle
    - 308 Tarsal Bone
    - 309 Metatarsal Bone
    - 310 Digit/Phalanx
    - 311 Foot, NEC
    - 398 Other Injury to Lower Extremity

- **Systemic and Special Injury**
  - 000 Defined as in Section 1 at left

- **Trunk**
  - 401 Rib(s)
  - 402 Sacroiliac Joint
  - 403 Spine (Inc. Cervical), Excluding Cord
  - 404 Pelvis
  - 405 Chest, NEC
  - 406 Abdomen, NEC
  - 407 Upper Back, NEC
  - 408 Lower Back, NEC
  - 409 Genitalia
  - 410 Heart
  - 498 Other Injury to Trunk

- **Respiratory Tract**
  - 501 Pharynx
  - 502 Larynx
  - 503 Trachea
  - 504 Bronchus
  - 505 Lung
  - 598 Other Injury to Respiratory Tract

- **Digestive Tract**
  - 601 Mouth Internal, e.g. Gum, Palate
  - 602 Oesophagus
  - 603 Stomach
  - 604 Small Bowel
  - 605 Colon
  - 606 Rectum
  - 607 Liver
  - 608 Spleen
  - 699 Injury to Other Internal Organs
  - 698 Other Injury to Digestive Tract

- **Nervous System**
  - 701 Brain, Not Concuision
  - 702 Brain Stem
  - 703 Cervical Spinal Cord
  - 704 Thoracic Spinal Cord
  - 705 Lumbar Spinal Cord
  - 706 Peripheral Nerve
  - 798 Other Injury to Nervous System

- **Soft Tissue**
  - 01 Cut/Laceration
  - 02 Puncture
  - 03 Bite
  - 04 Superficial Abrasion
  - 05 Penetrating Wound
  - 06 Other Wound, Incl. Amputation
  - 07 Haematoma/bruising
  - 08 Haemorrhage
  - 09 Inflammation/oedema/tenderness
  - 10 Burn, Full Thickness
  - 11 Burn, Partial Thickness
  - 12 Foreign Body In Soft Tissue
  - 13 Damage To Major Blood Vessel
  - 14 Crushing Injury

- **Bone, Tendon or Joint**
  - 20 Fracture
  - 21 Dislocation
  - 22 Sprain/Strain

### 3. Intent of Injury

- **Select One Code**
  - 0: Accidental Injury (i.e., unintentional)
  - 1: Intentionally Self-inflicted, or Possibly So
  - 2: Victim of Assault, or Possibly So
  - 3: Unknown Intent

### 4. What You Did With Your Patient

- **Select One Code**
  - 01 No Treatment
  - 02 Treated, No Referral
  - 03 Treated, Referred to Outpatients
  - 04 Treated, Referred to Family Doctor
  - 05 Treated, Other Referral

Note: NEC means "not elsewhere classified"