Australian Government
Australian Institute of Criminology

Theft and vandalism at residential building sites in Australia

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Technical and Background Paper

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ISSN 1445-7261
ISBN 0 642 53883 2

Project no. 0020
Ethics approval no. PO45
Dataset no. 0016

Published by the Australian Institute of Criminology
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Email: front.desk@aic.gov.au
Website: http://www.aic.gov.au

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Edited and typeset by the Australian Institute of Criminology

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Acknowledgments

The Australian Institute of Criminology (AIC) gratefully acknowledges the cooperation and continuing support provided by the Master Builders Association of Australia and the Housing Industry Association. Roy Morgan Research conducted the telephone survey and undertook coding of the data. The questionnaire was designed by Pat Mayhew and Mark White at the AIC. Russell G Smith, Natalie Taylor, Tony Krone and Rob McCusker at the AIC provided helpful comments on earlier drafts.

Executive summary

This report presents results from a study of the extent and nature of on-site theft from and vandalism to residential building sites throughout Australia. Due to their adverse effects on the building industry, theft and vandalism at residential development sites have become a growing concern. The adverse effects include the consequential cost of hiring or replacing stolen/damaged items, insurance excess payments, project delays and the added expense of improving security to protect against further damage. These costs are ultimately added to the cost of building a new home and thereby negatively affect new home owners.

To provide a fuller understanding of theft and vandalism at residential building sites in Australia, the Australian Institute of Criminology surveyed a sample of residential builders about their experiences of theft and vandalism in 2002. This study aimed to:

- assess the prevalence of theft and vandalism on residential building sites throughout Australia
- provide an estimate of the costs of theft and vandalism
- identify the number of incidents covered by insurance and in respect of which claims were made
- assess the number of incidents reported and not reported to the police
- identify the nature of theft and vandalism on residential building sites in terms of time, geographical area and type of items stolen
- examine the extent of security measures adopted
- identify areas for improvement to reduce opportunities for theft and vandalism on building sites.

Initially, a total of 7,014 residential builders (as defined in the Australian and New Zealand standard industry classification) throughout Australia were randomly selected from the electronic yellow pages. Of these, 2,003 were interviewed by telephone between 3 March and 16 April 2003 (26% of the original sample). The data from this survey were then weighted on the basis of the prevalence of builders in each state and territory, and on business size. This makes the survey results better reflect the actual residential building industry in Australia, rather than simply the profile of the builders who took part in the survey. The findings relate to events during the period 1 January to 31 December 2002 unless otherwise indicated.

Key findings

Characteristics of residential builders under review

- Ninety-five percent employed fewer than five people: only four percent employed between five and 19 people, with the remainder employing 20 people or more.
- Mean business turnover was about $1m, with a median turnover of $450,000.
- Residential builders (in median values) constructed one house and modified three houses during 2002.

The risk and rate of theft and vandalism

- Thirty-nine percent of residential builders were affected by theft or vandalism.
- Nineteen percent had experienced theft alone, seven percent had experienced vandalism alone, and 13 percent experienced both theft and vandalism.
- Sixty-five percent of theft victims and 66 percent of vandalism victims had experienced more than once incident.
- Residential builders who had experienced theft or vandalism in 2002 had suffered, on average, two incidents in the year.
- The risk of theft and vandalism generally rose with increasing numbers of staff and the amount of annual turnover.
- The risk of theft and vandalism also rose when the building site was in or close to an urban area.

The impact and cost of theft and vandalism to residential builders

- Twenty-nine percent of theft victims and 21 percent of vandalism victims felt that the most recent incident of theft or vandalism had a negative impact on their business.
- On average, the value of property stolen in the most recent incident of theft was $2,009, while the value of property damaged by the most recent incident of vandalism was $1,156.
- Twenty-four percent of victims of theft and 17 percent of victims of vandalism indicated that they had borne indirect financial costs resulting from these crimes, such as the building project being delayed.
- The mean amount of indirect losses incurred in the most recent incident of theft was $1,873, and $8,568 for vandalism, while the median amounts were $500 and $400 respectively.

Insurance

- Although 77 percent of theft victims and 72 percent of vandalism victims reported that their building premises were insured, a large proportion of victims made no claim to their insurance companies.
- As might be expected, insurance claims tended to be made where larger losses were involved. On average, the total value of the loss incurred from thefts where an insurance claim was made was $5,683, but $803 when no claim was made. In the case of vandalism, the total value of the loss from the incidents where a claim was made was $6,677 and $595 when no claim was made.

Reporting to the police

- Nearly half of theft victims and 30 percent of vandalism victims reported the most recent incident to the police.
- The decision to report an offence to the police was associated with the seriousness of the crime in terms of the total value of the loss.
- The most common reason indicated by victims of theft and vandalism for not reporting to the police was that they believed that 'it was not worth reporting or not serious enough'.
- A large proportion of theft and vandalism victims who reported the incidents to the police were satisfied with the way in which the police dealt with their cases.

The nature of theft and vandalism

- Theft was more likely to take place in the evening/night on weekdays, while vandalism was likely to take place more frequently in the evening/night on weekends.
- Nearly one-third of theft victims stated that the most recent incident of theft had involved some forced entry, mostly entry to a house.
- Thefts tended to take place at the final stage of construction.
- The most frequently stolen items from building sites were raw materials (61%), then small hand-held tools (46%). Although more expensive individual items were less frequently stolen, the most commonly targeted expensive items were whitegoods (17%) and heating/water systems (15%).

Perpetrators of theft and vandalism

- Forty-four percent of theft victims and 56 percent of vandalism victims reported that they had some idea, or knew, who might have been responsible for the most recent incident.

- Of those who had experienced theft in 2002, and who knew or had some idea about likely perpetrators of the most recent incident of theft, few blamed organised criminals or ordinary criminals. Instead, employees of other firms were most frequently thought to be the offenders (22%).
- The vast majority of victims of vandalism who knew or had some idea about likely perpetrators blamed local youth.

The use of crime prevention measures

- The majority of residential builders used some security measures at the beginning of 2002, but more than half (56%) had not spent any money on crime prevention in 2002.
- Residential builders who fell victim to theft or vandalism in 2002 invested, on average, $2,240 in crime prevention measures, while non-victims invested only $480 reflecting the fact that victims reacted after being victimised.
- Builders in urban areas spent more on crime prevention measures than those in non-urban areas, reflecting their greater exposure to risk.
- The most commonly employed security measures at the beginning of 2002 were to protect whitegoods, by only taking delivery of whitegoods immediately before installation (69%) and delaying the installation of whitegoods until immediately before occupancy (64%). Various forms of access control and target-hardening were also employed.
- Of residential builders who had experienced theft, 47 percent reported not having had any security measures in place at the time of the incident.

Predictors of victimisation

- Residential builders with an annual turnover of $1m or greater were more than three times more likely to experience theft or vandalism.
- Residential builders who worked in urban areas were at significantly greater risk of experiencing theft or vandalism.
- Residential builders who were victims of theft or vandalism were likely to employ more security measures and to spend some money on crime prevention measures, reflecting the fact that they were probably more aware of the risk faced.

Introduction

Background of the study

Construction is an integral part of the Australian economy. The housing industry contributes substantially to gross domestic product (GDP) and generates considerable employment opportunities. According to the Housing Industry Association (HIA) the industry contributed 3.78 percent to economic growth in the 12 months to March 2003 (HIA 2003a). The vast majority of businesses in the housing industry employ fewer than 20 full-time personnel. They provide jobs for almost 370,000 people (HIA 2003b). Activity in the housing industry mirrors the distribution of the population. Strong population growth, with a boost in the number of overseas migrants, has increased housing demand across Australia (HIA 2003c). In 2001–02, Australians spent $35b on building new homes and renovating existing homes – equivalent to 3.5 percent of GDP (HIA 2003b).

As the amount of money invested in housing projects has increased, there has been growing concern about crime at residential developments, particularly theft and vandalism. In 1992, widespread evidence of theft of building materials and equipment within the construction industry was cited in a report by the Royal Commission on the building industry in New South Wales (Gyles 1992). More recently, SA police reported that theft and property damage from building sites averaged about $4,000 per new house in South Australia (South Australia Police 2002).

Theft and vandalism on building sites have a number of adverse financial effects on businesses and home buyers. These include the cost of hiring or replacing stolen items, insurance excesses, increasing insurance premiums and costs of improving security measures (Lee 2002; Smith & Walmsley 1999). Non-financial costs are also incurred. For example, waiting for stolen items to be replaced may delay the building process, and hence builders' productivity. This may affect the reputation of businesses. The costs arising from theft and damage at building sites will ultimately be added to the cost of building new homes.

The present study looks at theft and vandalism on residential building sites, to inform appropriate crime prevention measures. Residential builders are defined as businesses or individual contractors principally engaged in the following activities:

- construction of new houses (excluding semi-detached houses)
- alterations or additions to existing houses
- renovation or general repairs to existing houses
- organising and managing these activities as the prime contractor.

Residential builders are classified as house construction industry code 4111 in the Australian and New Zealand standard industry classification (ABS 1993). Theft in this study is defined as theft from residential building sites or company vehicles parked on-site where residential

builders have been working. It does not include theft from other locations such as builders' own premises, or from their company vehicles while they were not parked on-site. Vandalism refers to malicious damage caused to residential building sites, such as graffiti, broken windows or damage to equipment.

The current study is informed by the notion of situational crime prevention. This refers to a preventive approach that relies on reducing opportunities for specific forms of crime (Clarke 1992). Situational crime prevention is comprised of five stages:

- collection of data about the nature and dimensions of the specific crime problem
- analysis of the situational conditions that permit or facilitate the commission of the crimes in question
- systematic study of possible means of blocking opportunities for these particular crimes
- implementation of the most promising, feasible and economic measures
- monitoring results and dissemination of experiences (Clarke 1992: 5).

This study covers the first three stages of situational crime prevention through a survey into the nature and extent of theft and vandalism on building sites. Clarke identified 12 types of situational prevention measures to reduce opportunities for crime to occur. Examples of situational prevention measures for theft and vandalism include target-hardening (e.g. the use of locks), access control (e.g. the use of locked gates and fenced yards) and surveillance by employees (e.g. the use of closed-circuit television, or CCTV). This study assesses the appropriateness of preventive measures employed by residential builders.

Prior research on building site crime

The construction industry in Australia is recognised as having been subject to numerous illegal activities in the past, ranging from physical violence or the threat of violence to the petty pilfering of building materials (Gyles 1992). Theft of construction equipment and building materials, in particular, is widely considered a common and widespread problem. However, it is difficult to estimate the scale of the problem due to the lack of official statistics identifying building site crime, and the absence of a specific reporting code for police investigation. Moreover, the number of incidents of theft and vandalism may be underestimated, as many incidents are unlikely to be reported to the police (Smith & Walmsley 1999).

Some empirical studies have been undertaken to identify the scale of crime relating to building sites, specifically theft of construction equipment. Smith & Walmsley (1999) examined the risk, cost and methods of construction equipment (or 'plant') theft that took place in the United Kingdom during 1997. They surveyed several industry sectors that were

likely to use construction equipment, and then focused on companies that reported theft of plant for the year. Based on responses from a sample of 1,868 businesses, they estimated that there were 26 thefts per 1,000 items of plant in use in 1997, which was higher than that for all motor vehicles (18 per 1,000). In Australia, Jeffrey (2001) also conducted a survey on plant theft within the construction industry. Of 247 residential builders, 68 percent reported that they had experienced theft of equipment during 1999–2000.

Professional criminals are often thought to be involved in illegal activities within the construction industry, especially theft of heavy plant equipment. Tim Purbrick, the manager of the National Plant and Equipment Register, has stated:

> although equipment theft can be opportunist, given the size of the equipment and the specialist assistance required in locating, moving and shipping the machines overseas, as well as selling them on, it is more common to find serious and organised criminal gangs involved (Purbrick 2003: 20).

The total value of plant equipment stolen in the United Kingdom is estimated to be between £25m and £100m a year (Purbrick 2003). In the United States, Thomas (1977) argued that theft of heavy and expensive equipment from construction sites was organised and systematic. In addition, contractors within the industry both encouraged and sustained the operation of the system (Thomas 1977). In Australia, there was an active and well-organised black market for stolen equipment and building materials in New South Wales (Gyles 1992).

There are other forms of theft from building sites. These include theft by workers of tools and materials, after-hours pilfering of timber and other materials by opportunist thieves and thefts by habitual offenders and others of fixtures and appliances (Clarke & Goldstein 2003). Previous studies found that theft of smaller and transportable equipment was much more prevalent than theft of heavy equipment (Smith & Walmsley 1999; Jeffrey 2001; Clarke & Goldstein 2003).

In the study by Smith and Walmsley, it was found that equipment was frequently reported to be stolen from building and construction sites (24%) or depots and yards (17%) mainly situated in urban areas. Equipment stolen was generally last seen on a Friday, only to be found missing on a Monday, indicating that theft incidents were most likely to take place over a weekend when most equipment was unattended (Jeffrey 2001; Smith & Walmsley 1999).

Previous studies have also shown that lax security within the construction industry facilitates crime. Relatively few security devices were employed to secure equipment or building sites. Even where some security measures at the location of theft were in place, they were in general unsophisticated and relatively easy to remove or alter (Jeffrey 2001; Smith & Walmsley 1999). In collaboration with the North Carolina police department, Clarke and Goldstein (2003) analysed security practices and risks of theft from residential building sites

in Charlotte, North Carolina. They found that delaying the installation of appliances until new owners had taken up residence was an effective measure.

Researchers at the Scottish Executive Central Research Unit investigated the experience of crime in Scotland in 1998 across five business sectors: manufacturing, construction, wholesale and retail, hotels and restaurants, and transport and telecommunications (Burrows et al. 1999). Within the construction sector, thefts of and from vehicles were most common, experienced by 23 percent of all the businesses. Another 16 percent had experienced vandalism to buildings, equipment and vehicles, and 15 percent had experienced thefts.

Past studies have thus demonstrated that theft from building and construction sites poses considerable risks to the building industry. Little research has focused on vandalism. The present study aims to supply information to fill this research need.

Research objectives

The Royal Commission report (Gyles 1992) found that the building and construction industry has been marked by widespread disregard for the law and unlawful conduct by unions, employers and individual contractors. In addition, previous research on building site crime suggests the involvement of professional criminals in illegal activities within the construction industry. A range of illegal activities involving the industry was identified in the Royal Commission's report. These activities include:

- physical violence and threats of physical violence
- economic crime such as corrupt, improper and irregular payments and tax avoidance
- breach of safety and award provisions by employers
- petty stealing of building materials.

The scope of this study was limited to theft and vandalism taking place on residential building sites. It examined whether these offences were thought by builders to be committed internally (by people within the industry) or externally (for example, by organised criminals). Specifically, the study sought to:

- assess the prevalence of theft and vandalism on residential building sites throughout Australia
- provide an estimate of the costs of theft and vandalism
- identify the numbers of incidents covered by insurance and claimed
- assess the number of incidents reported and not reported to the police

- identify the nature of theft and vandalism on residential building sites in terms of time, areas and types of items stolen
- examine the extent of security measures adopted
- identify areas for improvement to reduce opportunities for theft and vandalism on building sites.

Methodology

Sampling procedure

According to the Australian Bureau of Statistics (ABS), there were approximately 33,000 residential builders classified under the house construction industry classification code 4111 in Australia (ABS 1997). For the present study, 7,013 residential builders were selected from the electronic yellow pages to obtain at least 2,000 cases to allow appropriate statistical analysis. An introductory letter prior to the telephone survey was sent to each of these businesses. Of these, 5,294 businesses responded. The remaining 1,719 businesses were not contacted largely because their telephone numbers were disconnected or unobtainable. In other cases, numbers were engaged or not answered, being tried more than three times. Of 5,294 businesses contacted, 3,411 agreed to complete the interview. This was a response rate of 64 percent.

To qualify for the survey, these 3,411 businesses were screened to find out if they had carried out residential building work and had operated throughout 2002. As a result, 41 percent of the businesses that agreed to participate failed to qualify for the survey. Due to this stringent screening, the final sample comprised 2,003 residential builders, 29 percent of those originally contacted.

Questionnaire design

The questionnaire, designed by the Australian Institute of Criminology, covered the following topics:

- builders' experiences of theft and vandalism on residential building sites in 2002
- builders' perceptions of the seriousness of theft and vandalism on residential building sites
- the amount and value of property stolen or damaged
- security measures routinely undertaken to prevent theft and vandalism
- the extent of reporting incidents of crime to the police
- the extent of insurance cover for theft and vandalism
- builders' perceptions of the effectiveness of the police.

Pilot testing

A total of 60 pilot interviews were conducted by Roy Morgan Research on behalf of the AIC, using three interviewers. The interviewers reported that the survey was, for the most part, well received and that the questionnaire was successful. Minor changes were made to the pilot questionnaire for the main stage of the survey.

Introductory mailout

An introductory letter was sent to 7,013 residential builders (as defined previously). The letter, addressed to the company manager, outlined the research and indicated that an interviewer would make contact within a few days. Residential builders were assured that the identification of individuals or businesses would not be released or published in any form. The introductory letter included a contact number for the AIC in case the builder wanted more information or had any queries prior to the interview.

Interview procedures

Before the survey commenced, field coordinators and interviewers were briefed about the rationale for the survey, and the questionnaire and concepts. There was also a closely monitored interviewer practice session.

Interviews were completed by telephone between 3 March and 16 April 2003 using Roy Morgan Research's computer-assisted telephone interviewing facilities. All interviewing was supervised and at least 10 percent of each interviewer's calls were audited. To maximise responses, interviewers attempted at least three telephone calls to establish contact with residential builders, following the initial phone call. The average interview length was 18 minutes. Data from 2,003 residential builders are included in the final results.

Weighting

The data were weighted to reflect the overall population distribution of residential builders in Australian states and territories, as well as business size (total number of people employed during the last pay period) using the ABS 1996–97 population estimates for the private sector construction industry. In this way, the weighted results of the survey better reflect the profile of the building industry in Australia, rather than the profile of the builders who took part in the survey. The main differences are that builders in Queensland and Victoria were slightly underrepresented in the survey, whereas those in Tasmania and Western Australia were slightly overrepresented.

Table 1: State distribution of residential builders in Australia and in the interviewed sample

	Australia		Sample	
State	n	%	n	%
ACT	1,054	3.2	26	1.3
NSW	11,003	33.4	695	34.7
NT	124	0.4	12	0.6
Qld	8,444	25.6	429	21.4
SA	1,477	4.5	133	6.6
Tas	669	2.0	90	4.5
Vic	8,743	26.5	477	23.8
WA	1,461	4.4	141	7.0
Total	32,975	100.0	2,003	100.0

Source: ABS (1997); AIC, Theft and vandalism at residential building sites [computer file]

Reporting findings

All figures presented in this report were rounded to the nearest integer. Total percentages may not sum to 100 due to rounding. Percentages are based on weighted data, but with the actual sample numbers shown. Statistical significance tests were done on the unweighted data.

Ethical considerations

This study was approved by an institutional human research ethics committee on 21 May 2002. The data gathered were treated in accordance with the national privacy principles as defined in the Commonwealth *Privacy Act 1988*.

Findings

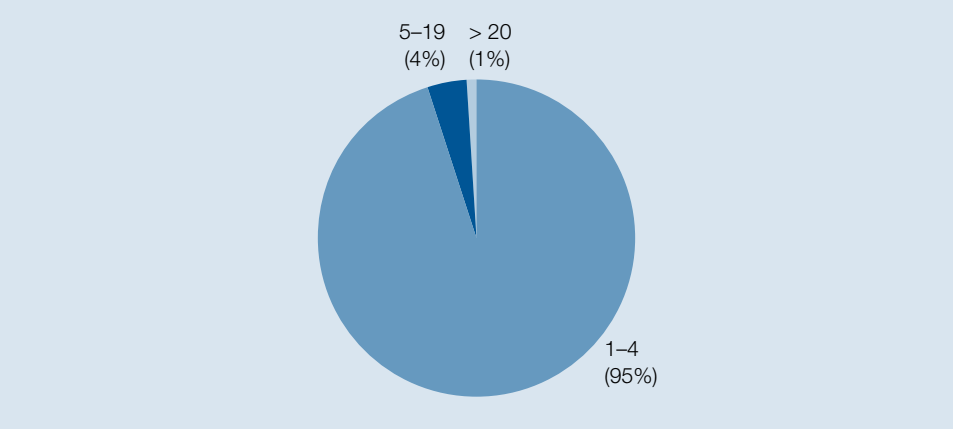
Characteristics of residential builders in Australia

This section outlines the characteristics of residential builders in Australia, including the total number of people employed during the last pay period in 2002, annual business turnover, and the total number of houses and/or apartments each residential builder built or modified in 2002.

Number of employees

The majority of residential builders (95%) employed fewer than five people. Only four percent employed between five and 19 people, with the remaining one percent employing 20 or more people in 2001.

Figure 1: Number of employees



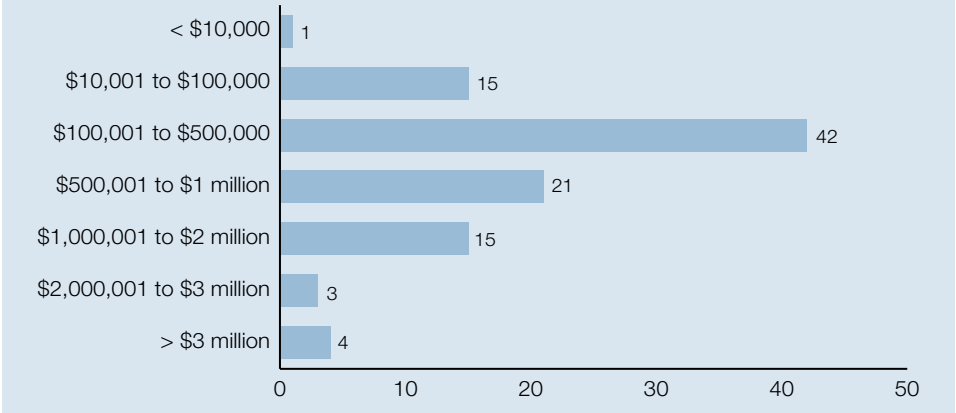
Note: n=2,003 (weighted n=32,975)

Source: AIC, Theft and vandalism at residential building sites [computer file]

Annual business turnover

Eighty-six percent of residential builders provided information on their total business turnover for 2002, ranging from zero to $400m. The mean amount of business turnover was about $1m, but there was much variability as indicated by a high standard deviation of $5,553,645. The median turnover of $450,000 better measures the 'middle value'. Forty-two percent of residential builders reported that their annual business turnover ranged from $100,001 to $500,000. Just over one-fifth had business turnover ranging from $500,001 to $1m. Only seven percent had turnover of more than $2m.

Figure 2: Annual business turnover (percent)



Note: n=1,731 (weighted n=28,369)

Residential builders who answered 'Can't say' (4% of residential builders) or refused to answer (10% of residential builders) were excluded from this figure. Percentages were calculated out of the total number of residential builders who provided information on their business turnover.

Source: AIC, Theft and vandalism at residential building sites [computer file]

The extent of business activities

The output of residential builders during 2002 was quantified by the total number of houses and/or apartments constructed and/or modified during the year (Table 2). Forty-five percent of residential builders stated that their companies had not built a house during 2002. Nearly 40 percent reported that they had built five houses or fewer. Twenty percent of residential builders had not modified any houses, and 45 percent had modified five houses or fewer. Work relating to apartments was not the major business activity of these residential builders, as the majority had neither built (90%) nor modified (90%) any apartments.

Table 2: Number of houses and apartments built or modified by residential builders (percent)

	Houses		Apartments	
Number	Constructed	Modified	Constructed	Modified
None	45	20	90	90
1–5	39	45	6	6
6–10	8	16	2	2
11–50	7	15	1	2
> 50	1	4	0	1
Sample n	1,999	1,986	1,992	1,993
Weighted n	32,879	32,544	32,716	32,717

Source: AIC, Theft and vandalism at residential building sites [computer file]

The number of new houses built and existing houses modified varied considerably. On average, five new houses were built (SD=38) and 21 modified (SD=287). An average of one new apartment was built (SD=19) and two existing apartments were modified (SD=30). However, given that the majority of residential builders had not done any work on apartments and nearly half had built or modified five houses or fewer, the median numbers better reflect the extent of business activity than mean numbers. In median numbers, residential builders had constructed one house and modified three houses but had not built or modified any apartments during 2002.

The incidence of theft and vandalism

The incidence of theft and vandalism in 2002 affecting the builders surveyed is shown in Table 3. Results indicate that 39 percent of residential builders in Australia had suffered theft or vandalism. Nineteen percent had experienced theft alone and seven percent had experienced vandalism alone. A further 13 percent of builders had experienced both theft and vandalism.

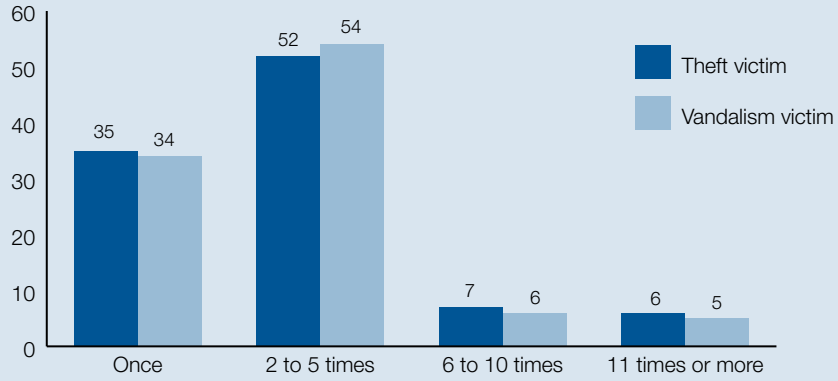
Table 3: Theft and vandalism victimisation

Type of crime	Sample n	Weighted n	%
Both theft and vandalism	342	4,266	13
Theft only	391	6,129	19
Vandalism only	148	2,231	7
None	1,105	20,164	61
Can't say	17	185	1
Total	2,003	32,975	100

Source: AIC, Theft and vandalism at residential building sites [computer file]

Figure 3 presents a breakdown of the number of incidents of theft and/or vandalism in 2002 among those who were victimised. A substantial proportion of builders were repeat victims (65% of theft victims and 66% of vandalism victims). On average, both theft victims and vandalism victims experienced two incidents of theft or two incidents of vandalism in 2002. This pattern of repeat, or multiple, victimisation among builders echoes that found in victimisation studies of a variety of populations, for instance, householders, young people, retailers, manufacturers and farmers. It reflects the well-established fact that the risk of victimisation is not evenly spread. Rather, some people (and in this case some builders) are more at risk of becoming a victim than others, and then once victimised are more likely than would be expected by chance to be victimised again. This is because the factors that rendered them vulnerable on one occasion (for instance, the type of area in which they build) will render them vulnerable again. It may also be that some builders are more vulnerable than others because they have fewer security measures in place. These points are discussed later.

Figure 3: Theft and vandalism repeat victimisation (percent)



Note: n=733 (weighted n=10,398) for theft victims, n=486 (weighted n=6,463) for vandalism victims

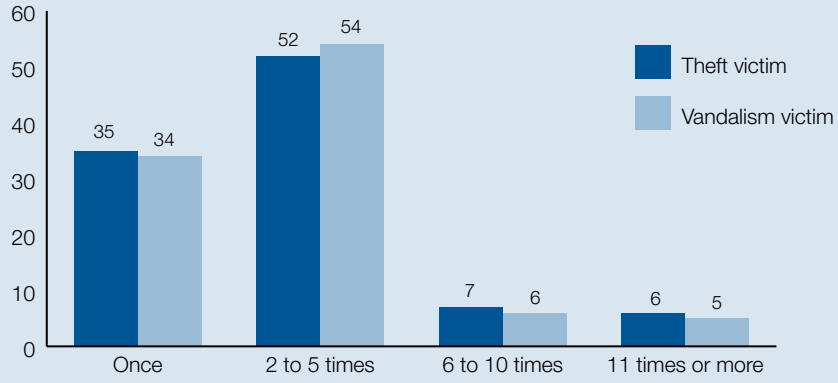
Residential builders who answered 'Can't say' or refused to answer were excluded from this figure (they accounted for less than 1% of theft victims and less than 1% of vandalism victims). Percentages were calculated out of the total number of victims of each crime who gave the information on the number of times they had been victimised.

Source: AIC, Theft and vandalism at residential building sites [computer file]

Perceptions of seriousness of theft and vandalism

Residential builders were asked about their perceptions of the seriousness of the problem of theft and vandalism on building sites. Predictably, residential builders who were victimised at least once in 2002 were more likely to see theft or vandalism as 'a very big' or 'quite a big' problem than non-victims. Nearly half of theft victims perceived theft as a very big problem or quite a big problem, but only eight percent of non-theft victims perceived it to be so (Figure 4). While 31 percent of victims of vandalism perceived vandalism as a very big or quite a big problem, only five percent of non-victims of vandalism perceived it to be so (Figure 5). Overall, victims of theft were more concerned about crime problems on building sites than victims of vandalism.

Figure 4: Perceptions of seriousness of theft (percent)

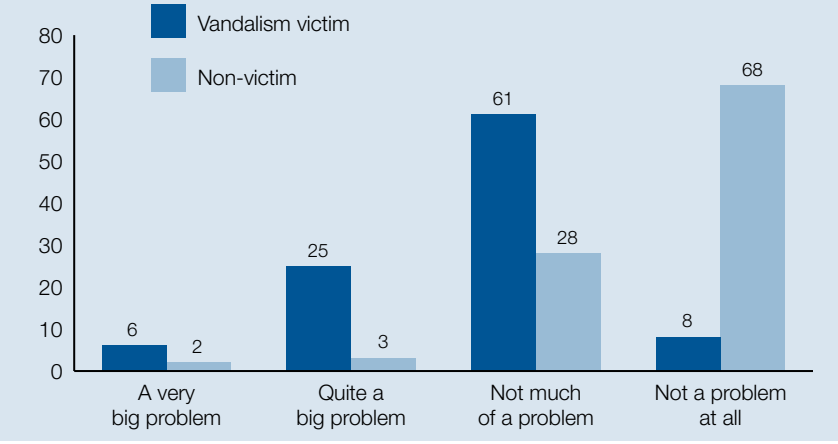


Note: n=741 (weighted n=10,470) for theft victims, n=1,256 (weighted n=22,426) for non-victims

Residential builders who answered 'Can't say' or refused to answer were excluded from this figure (they accounted for less than 1% of residential builders). Percentages were calculated out of the total number of residential builders who specified their perceptions of crime within each group (victims and non-victims).

Source: AIC, Theft and vandalism at residential building sites [computer file]

Figure 5: Perceptions of seriousness of vandalism (percent)



Note: n=490 (weighted n=6,474) for vandalism victims, n=1,498 (weighted n=26,304) for non-victims

Residential builders who answered 'Can't say' or refused to answer were excluded from this figure (they accounted for less than 1% of residential builders). Percentages were calculated out of the total number of residential builders who specified their perceptions of crime within each category (victims and non-victims).

Source: AIC, Theft and vandalism at residential building sites [computer file]

Business size and risk

Data were collected on the size of businesses and location of work to determine whether these had any impact on the prevalence and incidence of theft and vandalism. Business size was measured by the total number of people employed during the last pay period of 2002, as well as annual business turnover. Risks were higher for larger builders: 52 percent of those who employed five people or more had suffered theft and 37 percent had suffered vandalism. Among companies employing four people or fewer, only 31 percent were victim to theft and 19 percent to vandalism (Table 4).

Table 4: Theft and vandalism victimisation by number of employees (percent)

	Theft		Vandalism	
Number of employees	Victim	Non-victim	Victim	Non-victim
1–4 people	31	69	19	81
> 5 or more people	52	48	37	63
Sample n	742	1,454	490	1,499
Weighted n	10,491	22,420	6,497	26,344
	$X^2(1)=86.32$, $p<0.001$		$X^2(1)=72.18$, $p<0.001$	

Source: AIC, Theft and vandalism at residential building sites [computer file]

Table 5: Theft and vandalism victimisation by business turnover (percent)

	Theft		Vandalism	
Business turnover	Victim	Non-victim	Victim	Non-victim
< $100,000	20	80	13	87
$100,001 – $500,000	24	76	13	87
$500,001 – $1 million	35	65	20	80
> $1 million	56	44	41	69
Sample n	653	1,073	434	1,290
Weighted n	9,300	19,012	5,820	22,470
	$X^2(3)=202.98$, $p<0.001$		$X^2(3)=153.78$, $p<0.001$	

Source: AIC, Theft and vandalism at residential building sites [computer file]

Since size of business is related to turnover, it is no surprise that the rate of victimisation was significantly higher for builders who had high business turnover (Table 5). Of those with turnover of more than $1m, 56 percent had been subject to theft, and 40 percent had been subject to vandalism. However, of businesses with a turnover of $100,000 or less, only 20 percent had experienced theft and 13 percent vandalism. It is likely that large companies

face higher risks because they have more building sites in operation, thereby increasing their exposure to victimisation In a study of different businesses. In Scotland, Burrows et al. (1999) found very similar results.

Location of work and risk

The location of building sites where residential builders' work was mainly conducted in 2002 was examined for victimisation rates. It was found that risks were higher in central business districts (CBDs). Of those working in CBDs, 44 percent had been subject to theft, with building sites in inner city suburbs (40%) and outer suburbs (40%) not far behind. For vandalism, CBD areas, inner city suburbs and outer suburbs were at equally high risk (25% each). The higher risks at building sites in urban areas may be due to their greater visibility and accessibility, especially to a larger number of actual and potential local offenders. The larger number of building projects in urban areas will also mean more opportunities for theft and vandalism.

Previous victimisation studies of householders, businesses, etc. have consistently found higher risks for those in inner cities and economically deprived areas, and this pattern is also evident in police statistics. The present study did not, however, examine the socioeconomic level present in locations at which crimes were committed, as this was beyond its scope. Such a study would provide a fruitful avenue for future research.

Table 6: Theft and vandalism victimisation by location (percent)

	Theft		Vandalism	
Location	**Victim**	**Non-victim**	**Victim**	**Non-victim**
CBD areas	44	56	25	75
Inner-city suburbs	40	60	25	75
Outer suburbs	40	60	25	75
Major regional towns	30	70	20	80
Smaller regional towns	18	82	12	88
Rural areas	20	80	10	90
Sample n	740	1,252	489	1,496
Weighted n	10,472	22,343	6,472	26,274
	$X^2(5)=88.05$, $p<0.001$		$X^2(5)=56.25$, $p<0.001$	

Source: AIC, Theft and vandalism at residential building sites [computer file]

The impact and cost of building site theft and vandalism

Costs incurred following incidents of theft and/or vandalism are of particular interest. These costs were measured in terms of the total value of the loss, net replacement costs and certain indirect losses:

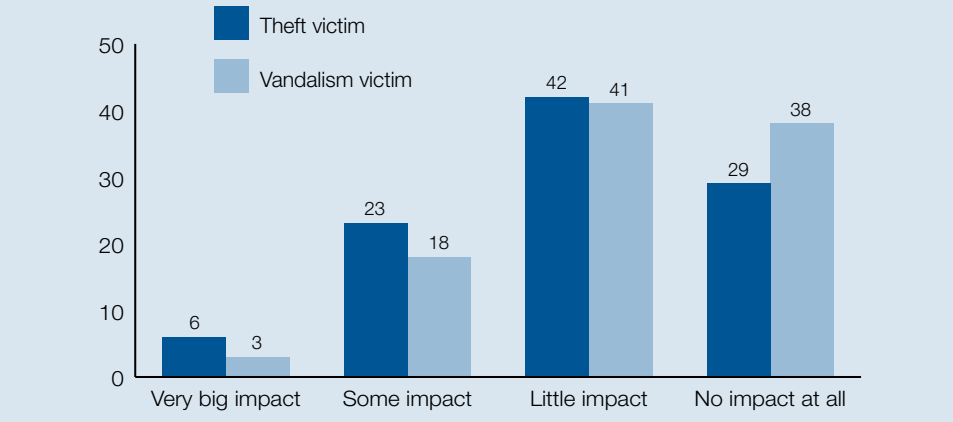
- The total value of the loss was defined as the total value of items stolen or damaged (notably the cost of stolen tools, broken windows, etc.)
- Net replacement costs were defined as the total value of property loss and damage after deducting any insurance payment (if any claims were made) and any property recovered; direct losses were only applicable to victims who made an insurance claim and/or whose stolen items were completely or partially recovered.
- Indirect losses were defined as financial costs to victims apart from direct losses, that is, lost contracts, delays of the completion of a project, penalty clauses or losses caused through disruption to business.

To simplify the calculation of costs, especially for those victimised more than once, builders were asked to report on the last incident of theft and vandalism that had occurred. To reduce response burden, this 'last incident' approach is a common feature of victimisation surveys. It merits a word of caution, however. Some respondents may either forget a less serious incident if it was the last one to have occurred, or they choose instead to report on one that was more important, and memorable for them. On balance, the 'last incident' approach is likely to inflate the average seriousness of incidents reported.

The impact of theft and vandalism

As shown in Figure 6, more than one in five residential builders who had been victimised (29% of theft victims and 21% of vandalism victims) indicated that the most recent incident of theft or vandalism had a very big or some negative impact on their businesses.

Figure 6: Perceived impact of theft and vandalism (percent)

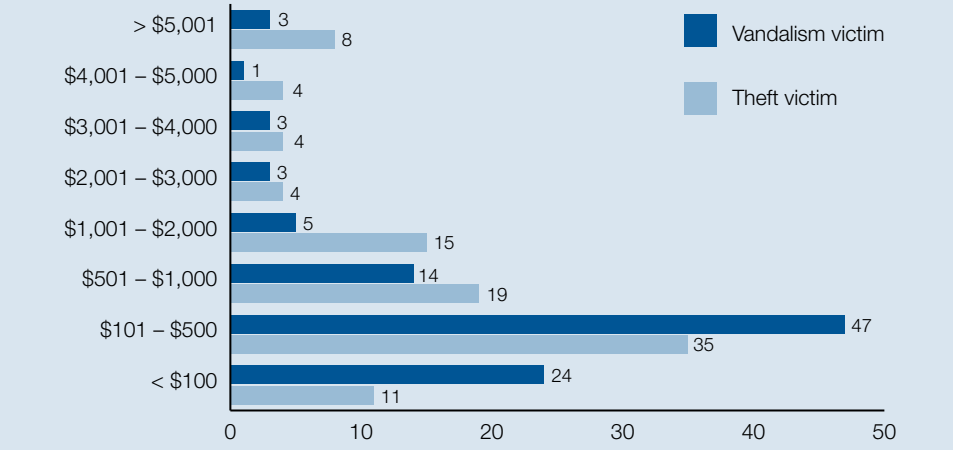


Note: n=733 (weighted n=10,398) for theft victims, n=487 (weighted n=6,396) for vandalism victims

Residential builders who answered 'Can't say' or refused to answer were excluded from this figure (they accounted for less than 1% of vandalism victims). Percentages were calculated out of the total number of victims of each crime who specified the levels of impact.

Source: AIC, Theft and vandalism at residential building sites [computer file]

Figure 7: Total value of loss suffered by theft and vandalism victims (percent)



Note: n=733 (weighted n=10,245) for theft victims, n=491 (weighted n=6,227) for vandalism victims

Residential builders who answered 'Can't say' or refused to answer were excluded from this figure (they accounted for 1% of theft victims and 1% of vandalism victims). Percentages were calculated out of the total number of victims of each crime who specified the amount of the loss.

Source: AIC, Theft and vandalism at residential building sites [computer file]

The total value of losses

On average, in the last incident, the loss incurred from vandalism was lower than the loss incurred from theft. The maximum total loss from theft was $150,000. The mean amount of total loss was $2,009 (SD=$4,780) and the median amount was $600. For vandalism, the mean and median amounts of the total losses were $1,156 (SD=$5,643) and $300 respectively.

Figure 7 shows the total value of last incident losses estimated by builders who experienced theft or vandalism. Half of vandalism victims and over one-third of theft victims reported losses ranging between $101 and $500. Fourteen percent of vandalism victims and 19 percent of theft victims reported losses of between $501 and $1,000. A very small percentage of victims of either theft or vandalism reported a loss over $5,000 (8% for theft and 3% of vandalism respectively). Although the total value of items stolen or vandalised on the most recent occasion was found not to be significant for each victimised builder, repeat victimisation could affect businesses significantly.

Net losses

Some victimised businesses recovered compensation from insurance, or recovered some stolen goods, although the proportion was relatively small. of the mean amount of net losses incurred from theft was $2,409 (SD=$5,444), while for vandalism it was $991 (SD=$1,147). The median amounts incurred from theft and vandalism were $600 and $500 respectively.

Indirect losses

In addition to costs incurred in replacing stolen items or restoring damaged premises, indirect costs may be incurred as a result of theft or vandalism. In this survey, 24 percent of theft victims and 17 percent of vandalism victims indicated that they had borne some indirect financial costs resulting from the most recent incident of the crime (such as delays in the project, penalty clauses and so on). For the minority with indirect losses, the mean amount lost through theft was $1,873 (SD=$4,143). The mean amount lost from vandalism was higher at $8,568 (SD=$46,952), although the difference is on a small numerical base and therefore should be viewed cautiously. For those with indirect losses, the median amounts incurred from theft and vandalism were $500 and $400 respectively.

These figures of indirect losses are based simply on those who incurred them. Expressing the figures on the base of all victims gives much lower figures – in the region of $165 for theft and $360 for vandalism.

Insurance

The number of victims insured against loss or damage to the contents of their premises was high. As shown in Table 7, 77 percent of theft victims and 72 percent of vandalism victims reported that their building premises were insured. However, this does not mean that most victims received insurance settlements in respect of losses sustained. In fact, a large percentage of victims who were insured made no claim to their insurance companies (74% for theft victims and 88% of vandalism victims).

Table 7: Insurance coverage (percent)

Insurance	Theft victims	Vandalism victims
Insured	77	72
Not insured	21	25
Can't say/refused	2	3
Sample n	632	395
Weighted n	10,398	6,500

Source: AIC, Theft and vandalism at residential building sites [computer file]

One reason for the low rate of claims is that the total loss was not high enough to outweigh the cost of the policy excess, or of the trouble involved in making a claim. Table 8 shows the difference in the mean total value of losses for incidents where a claim was made, and those where there was no claim. (These results are based on the last incident that victims had experienced, if there was more than one in 2002.) On average, total loss in incidents of theft where insurance claims were made was $5,683, but only $803 for 'no-claim' incidents. For vandalism, the average total loss where claims were made was $6,677, but again much lower, at $595, for 'no-claim' incidents. Thus, as might be expected, insurance claims tended to be made where larger losses were involved.

Table 8: Value of losses when claims were made versus not made

	Claim being made ($)	No claim being made ($)	t-value
Theft	5,683	803	-8.09**
Vandalism	6,677	595	-5.52**

** Statistically significant at $p<0.001$

Source: AIC, Theft and vandalism at residential building sites [computer file]

Reporting crime to the police

Not all incidents experienced by residential builders came to the attention of the police. As shown in Table 9, less than half (46%) of theft victims reported the most recent incident of theft to the police, while only 30 percent of victims of vandalism did so. A large percentage of victims who had reported the crime stated they were very satisfied or satisfied with the way in which the police dealt with their claims (69% of theft victims and 64% of vandalism victims who had reported; Figure 8).

Table 9: Reporting crime to the police (percent)

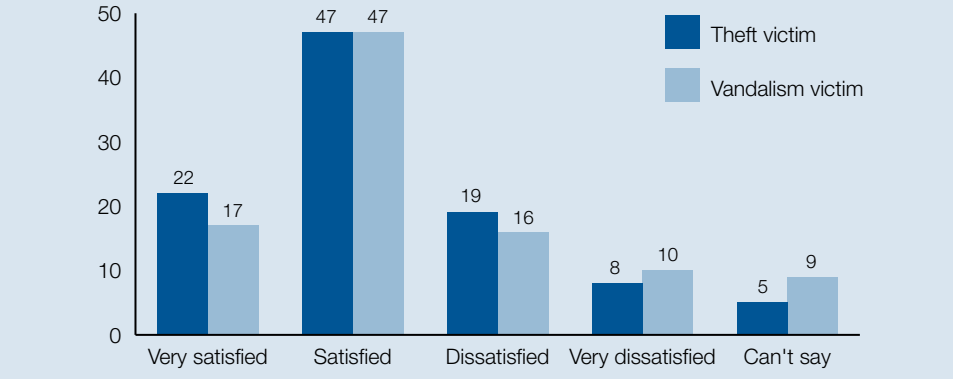
Police reporting	Theft victims	Vandalism victims
Reported	46	30
No reported	53	69
Can't say	2	1
Sample n	733	482
Weighted n	10,398	6,500

Source: AIC, Theft and vandalism at residential building sites [computer file]

The most common reason given by victims of both theft and vandalism for not reporting to the police was that they believed the incident 'was not worth reporting or not serious enough' (66% for unreported thefts and 73% for unreported vandalism incidents). Other common reasons were that 'police wouldn't have been able to do anything/chance of success slight' (25% for theft and 19% for vandalism), 'lack of time/too much trouble' (15% for theft and 12% for vandalism), and 'police wouldn't have been interested' (11% for theft and 9% for vandalism).

As might be expected, incidents with higher value losses were more likely to be reported to the police (Table 10). The average total loss in reported incidents of theft was about six times higher ($3,604) than in unreported incidents ($608). The figures for vandalism were $2,886 and $408 respectively.

Figure 8: Levels of satisfaction with police action (percent)



Note: n=353 (weighted n=4,750) for theft victims, n=167 (weighted n=1,957) for vandalism victims

Source: AIC, Theft and vandalism at residential building sites [computer file]

Table 10: Value of losses reported and unreported

	Reported ($)	Unreported ($)	t-value
Theft	3,604	608	-6.73**
Vandalism	2,886	408	-5.14**

** Statistically significant at p<0.001

Source: AIC, Theft and vandalism at residential building sites [computer file]

Nature of theft and vandalism

Types of work engaged in when victimised

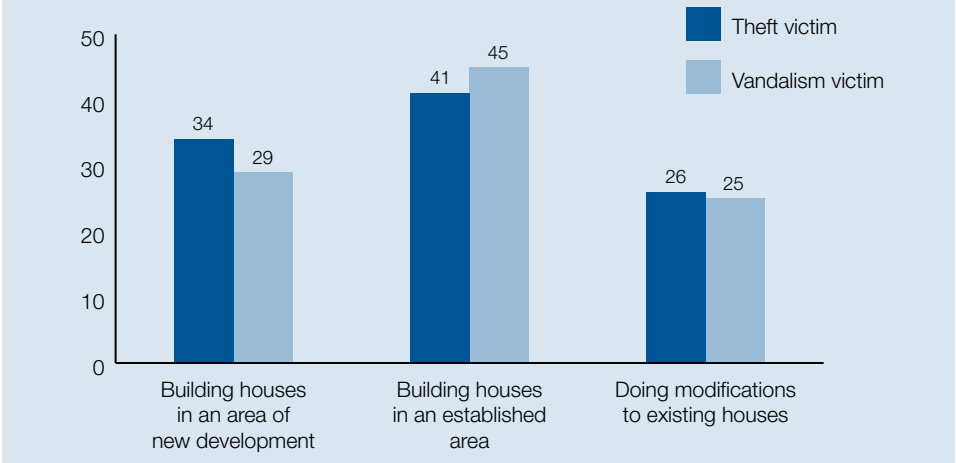
Residential builders who had been victimised were asked whether the most recent incident had occurred while they had been:

- building houses in an area of new development
- building houses in an established housing area
- doing modifications to existing houses
- doing other residential work.

As shown in Figure 9, incidents of both theft and vandalism occurred most frequently in an established area (this was the case for 41% for all thefts and 45% of all vandalism incidents). A smaller proportion of incidents occurred in an area of new development (34% of thefts and 29% of incidents of vandalism). Relatively few incidents took place when builders were making modifications to existing houses. It should be noted that these distributions of

incidents do not necessarily mean that risks of theft and vandalism in established areas are higher than in other areas, since no account is taken of the volume of building activity in the different areas. In fact, builders in general spent a greater proportion of their time working on modifications to existing houses than on building houses in established areas or new developments. The results suggest that working on modifications is less risky. This may be because these premises have been occupied by residents or unoccupied for only a short time while being modified, which would make it difficult for intruders to break into premises.

Figure 9: Incidence of theft and vandalism by type of building work (percent)



Note: n=729 (weighted n=10,394) for theft victims, n=485 (weighted n=6,393) for vandalism victims

Residential builders who answered 'Can't say' or refused to answer were excluded from this figure (they accounted for less than 1% of theft victims and 2% of vandalism victims). Percentages were calculated out of the total number of victims of each crime who specified the type of work.

Source: AIC, Theft and vandalism at residential building sites [computer file]

When theft or vandalism took place

Month

Victims were asked to report the month in 2002 in which their most recent incident of theft and vandalism took place. This places some limits on what can be taken from this study about the distribution of victimisation across different months of the year. First, the so-called recency bias (where people tend to think events happened more recently than was actually the case) means victims reported more incidents at the end of 2002 than when they actually occurred. Second, the question was posed in relation to the most recent incident. Since about two-thirds of victims had been victimised more than once, the most recent incident was more likely to have happened later in the year. Another methodological problem was

that six percent of theft victims and 12 percent of vandalism victims could not specify the month of the most recent incident. Finally, risks of victimisation across time are likely in part to reflect peaks and troughs in building activity itself.

Bearing in mind these caveats, the results showed that half (49%) of thefts and 45 percent of incidents of vandalism occurred between October and December (Figure 10). This might reflect the time at which more construction work was likely to be undertaken, or when the premises were more likely to have been unattended due to the Christmas holidays. Moreover, November and December coincide with the end of the school year. A previous study about vandalism of signs (e.g. road signs) noted that this took place more frequently during certain months of the year including summer months when schools were closed, at graduation times, the end of the school year and times of community festivals (Chadda & Carter 1983).

Figure 10: Theft and vandalism by month (percent)

Note: n=689 (weighted n=9,754) for theft victims, n=436 (weighted n=5,701) for vandalism victims

Residential builders who answered 'Can't say' or refused to answer were excluded from this figure (6% of theft victims and 12% of vandalism victims). Percentages were calculated out of the total number of victims of each crime who specified the month.

Source: AIC, Theft and vandalism at residential building sites [computer file]

Day of the week

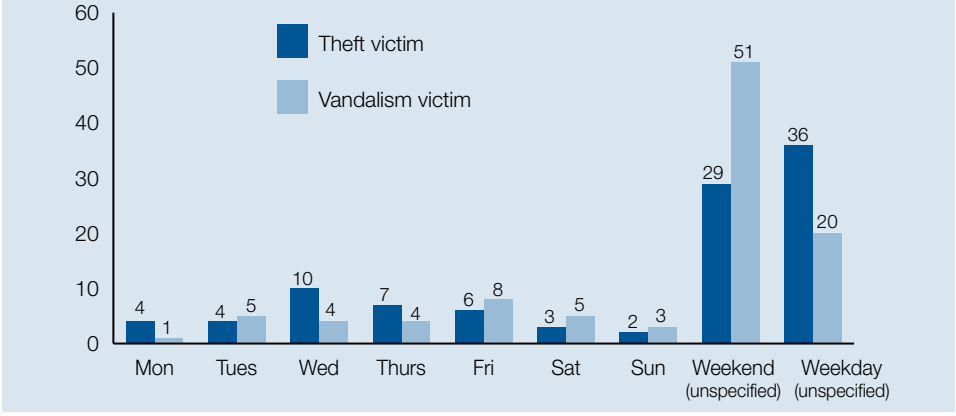
Residential builders who experienced crime were also asked to specify which day of the week the most recent incident took place. Eighteen percent of theft victims and 21 percent of vandalism victims could not say, while others could only specify that it had been 'in the week' or 'at the weekend'. Nevertheless, 67 percent of victims reported that the most recent incident of theft had been on a weekday, and 33 percent on the weekend. There was more weekend activity for vandalism, however, with only 42 percent of incidents on weekdays but

59 percent at the weekend (Figure 11). The present results are not particularly consistent for theft with those of Smith and Walmsley (1999) or Jeffery (2001) who found more weekend activity than the present study. However, the concentration of vandalism at the weekend is in line with other studies on vandalism (e.g. Houghton 1982).

Time of the day

Twenty-one percent of victims of theft and 28 percent of victims of vandalism could not specify the time of day when the most recent incident occurred. Of those who could, 74 percent of theft victims reported that the incident had taken place in the evening and/or night, while 26 percent reported that it had happened in the morning and/or afternoon. For vandalism, rather more (82%) reported that it had happened in the evening and/or night.

Figure 11: Theft and vandalism by day of the week (percent)



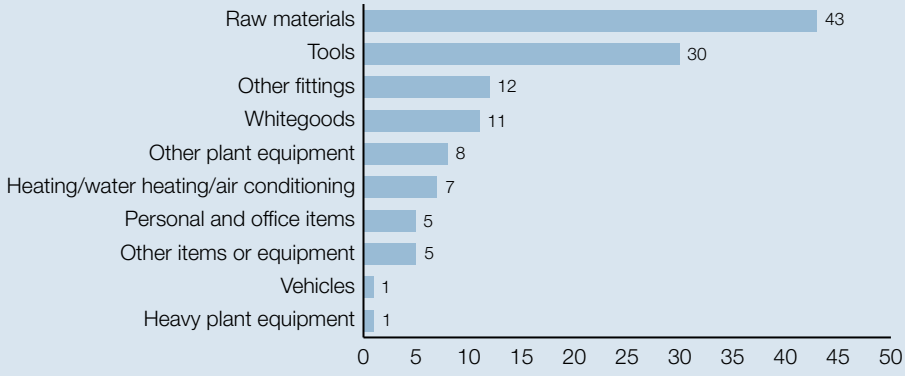
Note: n=591 (weighted n=8,501) for theft victims, n=387 (weighted n=5,113) for vandalism victims

Weekend (unspecified) refers to incidents that occurred on the weekend but where the specific day (Saturday or Sunday) was unknown. Weekday (unspecified) refers to incidents that occurred on a weekday, but where the specific day of the week was unknown.

Residential builders who answered 'Can't say' or refused to answer were excluded from this figure (they accounted for 18% of theft victims and 21% of vandalism victims). Percentages were calculated out of the total number of victims of each crime who specified the day of the week.

Source: AIC, Theft and vandalism at residential building sites [computer file]

Figure 12: Types of items stolen (percent)



Note: n=632 (weighted n=10,398)

Multiple responses were possible with this question. Percentages were calculated out of the total number of residential builders who fell victim to theft.

Raw materials included bricks, pavers, electrical cables, timber and tiles. Tools included carpentry tools and electrical tools. Other fittings included vanity units, shower screens, baths, ornate doors, cupboards, exhaust fans, light fittings, windows fittings and security fittings. Whitegoods refer to fridges, dishwashers, ovens and stove-tops. Other plant equipment included such things as compactors, scaffolding, generators, brick saws and concrete mixers.

Source: AIC, Theft and vandalism at residential building sites [computer file]

A snapshot of patterns of theft

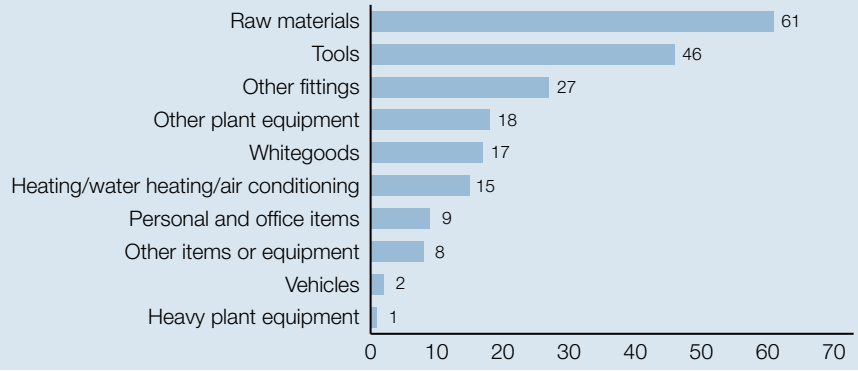
To more fully investigate the nature of theft on building sites, further questions were addressed to victims concerning the most recent incident. These questions were:

- **What was stolen from the building site?** It was found that raw materials were the most frequently stolen item (43%), followed by hand-held tools (30%). Whitegoods were also frequently stolen, but to a much lesser extent (11%) (Figure12).
- **At what stage of construction did the incident take place?** The risk of theft was the highest in the final stage of construction, with more than half of theft victims reporting the most recent incident occurring at close to the completion of a housing project (that is, at lock-up stage). A further 31 percent reported that it had occurred at the halfway point of the project. Only 16 percent reported that it had occurred when a project had just started.
- **From which parts of the premises were items stolen?** As might be expected from the types of items frequently stolen, thefts from an open site (42%) or thefts from a house being constructed (40%) were the most common. Thefts from a site shed, shipping container, vehicle or garage were infrequently reported.
- **Were there any signs of forced-entry?** Nearly one-third of all theft victims stated that the incident had involved some forced entry, most of which involved entry to a house. The majority of builders who had whitegoods stolen reported that they had been stolen from the locked house after they had been completely installed.

Items generally stolen

Victims of theft were asked what had been stolen from the building site or from vehicles located at the site. Previous studies have noted that theft of smaller and transportable equipment was much more prevalent than theft of heavy equipment (Clarke & Goldstein 2003; Jeffrey 2001; Smith & Walmsley 1999). A report by Lee (2002) indicated that timber was frequently stolen from building sites in the city of Casey and metropolitan Melbourne regions. Findings of the current study were consistent with these studies.

Figure 13: Total items stolen in 2002 (percent)



Note: n=742 (weighted n=10,491)

Percentage was calculated out of the total number of residential builders who had been victims of theft in 2002. Multiple responses were given to this question.

Source: AIC, Theft and vandalism at residential building sites [computer file]

While Figure 12 shows the types of item stolen during the most recent incident, Figure 13 represents all items stolen in 2002. Raw materials (e.g. bricks and timber) were cited by the highest proportion of victims (61%), followed by small and hand-held equipment (e.g. carpentry and electrical tools; 46%). In addition, 18 percent of victims had whitegoods stolen. Thefts of heavy plant accounted for only one percent of items stolen.

Among those who reported theft of raw materials, 77 percent mentioned timber. Although mentioned less often than timber, 22 percent said they had bricks and pavers stolen, and 18 percent said sand and cement. Carpentry tools (27%) and general tools (30%) were the most frequently targeted tools, followed by power saws and drills (25%), and electricians' tools (17%). Among those who mentioned whitegoods (17%), the most commonly targeted items were stove-tops (70%), ovens (63%) and dishwashers (35%).

The results show that portable and/or non-specialised items such as timber, hand-held tools or house fittings are stolen most often, while thefts of specialised heavy plant were comparatively infrequent. This undercuts the notion that activities of organised criminals in

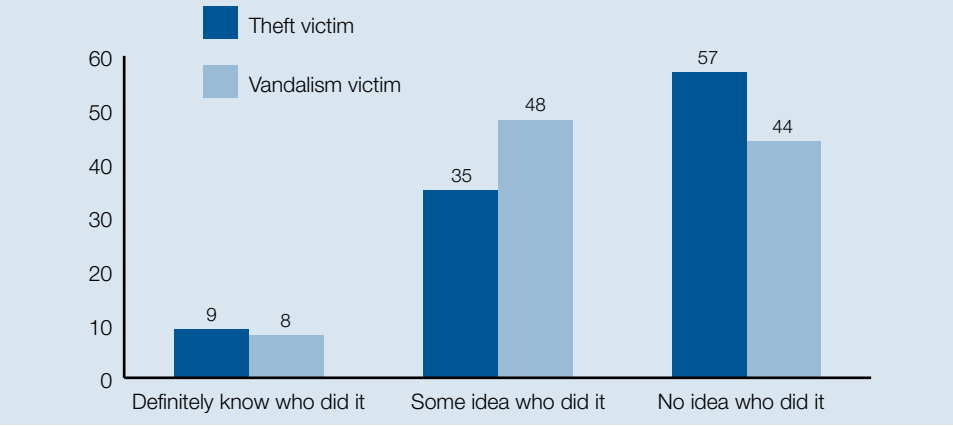
theft from building sites in Australia are the major problem. Results also suggest that there is a need for additional security measures for high risk items and for the building in general after whitegoods and heating systems are installed.

Victims' views about perpetrators of the crime

Residential builders were asked if they had any idea who might have been responsible for the most recent occasion of crime they had experienced. If they knew or had some idea about perpetrators, they were asked to identify the perpetrators by reference to a number of specified categories (not by name). Previous research has shown that perpetrators of vandalism are likely to be teenagers, particularly males aged between 14 and 16 (Abru 2002; Gladstone 1978; Goldstein 1996). A number of studies of household burglary have also found that burglars tend to commit their offences close to where they live and that their victims have some knowledge of their identities (Mawby 2001).

Of the residential builders who had been victims of theft, 44 percent said that they had some idea (35%) or definitely knew (9%) who might have been responsible for the most recent incident. More than half the vandalism victims reported that they had some idea (48%) or definitely knew (8%) who vandalised their site (Figure 14). As with previous research, local youths were most commonly thought to be responsible for the most recent incident of vandalism (94%). For theft, however, responses display greater variability (Figure 15). Employees of other firms were thought to be most likely to be responsible for thefts (22%). Neighbours and local youths were cited by 19 percent of victims. Sixteen percent of victims suspected that the theft might have been committed internally (by ex-employees, current employees or subcontractors). Only 11 percent of theft victims thought ordinary criminals (7%) or organised criminals (4%) might have been the perpetrators of thefts they had recently experienced. These perceptions of the residential builders could not, of course, be independently verified.

Figure 14: Victims' knowledge of who the perpetrator was (percent)

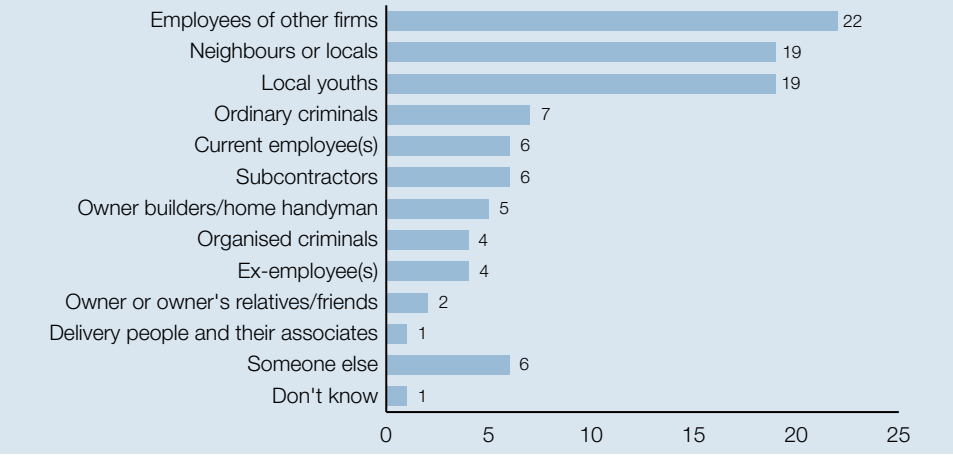


Note: n=729 (weighted n=10,366) for theft victims, n=489 (weighted n=6,471) for vandalism victims

Residential builders who answered 'Can't say' or refused to answer were excluded from this figure (they accounted for less than 1% of theft victims and less than 1% of vandalism victims). Percentages were calculated out of the total number of victims of each crime who specified the answer.

Source: AIC, Theft and vandalism at residential building sites [computer file]

Figure 15: Types of perpetrator identified by theft victims (percent)



Note: n=290 (weighted n=4,479)

Percentages were calculated out of the total number of theft victims who might have known their perpetrators.

Source: AIC, Theft and vandalism at residential building sites [computer file]

Use of crime prevention measures

Regular use of security hardware and crime prevention measures

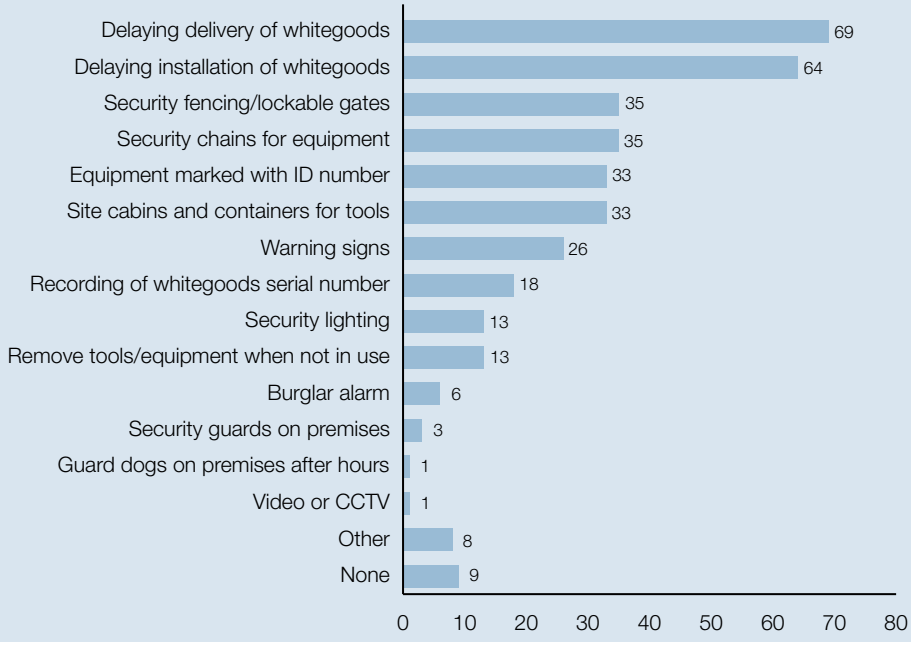
Data were collected on the extent to which crime prevention measures were regularly in place on building sites. In theory, taking security measures should reduce the risks of crime. For example, Clarke and Goldstein (2003) have shown that delaying installation of appliances until the new owners have taken up residence is an effective measure to reduce the risk of theft on building sites. A breakdown of the type of security measures that were regularly employed by residential builders at the beginning of 2002 is shown in Figure 16.

In the current study, it was found that 64 percent of the 2,003 residential builders followed the practice of target removal suggested by Clarke and Goldstein (2003) by delaying the installation of whitegoods until immediately before occupancy. Moreover, 69 percent reported only taking delivery of whitegoods immediately before installation. Other target hardening and access control measures were used less often:

- security fencing/lockable gates (35%)
- security chains for equipment (35%)
- site cabins and containers for tools (33%)
- equipment marked with identification numbers (33%).

A small percentage of the residential builders regularly used formal surveillance such as burglar alarms, security guards, guard dogs or surveillance cameras. Nine percent of residential builders had not used any of the prevention measures listed in Figure 16.

Figure 16: Types of crime prevention measures employed by residential builders (percent)



Note: n=2,003 (weighted n=32,975)

Multiple responses were possible with this question. Percentages were calculated out of the total number of residential builders.

Source: AIC, Theft and vandalism at residential building sites [computer file]

Table 11: Average amounts of money spent on crime prevention measures by location

Location of work	Sample n	Weighted n	Amount ($)
CBD	84	1,249	1,686
Inner-city suburbs	349	5,195	1,591
Outer suburbs	571	9,431	1,681
Major regional towns	408	6,860	796
Smaller regional towns	314	5,605	565
Rural areas	206	3,672	516
		F(5)=2.67 p<0.05	p<0.001

Source: AIC, Theft and vandalism at residential building sites [computer file]

All residential builders were asked to estimate the amount of money they had spent on crime prevention measures throughout 2002, excluding insurance premiums. The mean amount was $1,146. The maximum amount spent was $570,000. Fifty-six percent of residential builders did not spend any money on crime prevention in 2002. They may have felt previous expenditure was sufficient, and/or have been reluctant to spend more.

Expenditure on crime prevention by those residential builders who were victims in 2002 was significantly higher than the amount invested by non-victims ($t = -5.73$ $p<0.001$). On average, victims of crime spent $2,240 while non-victims spent $480. This almost certainly reflects extra spending by victims as a result of their experience, especially if they were repeat victims.

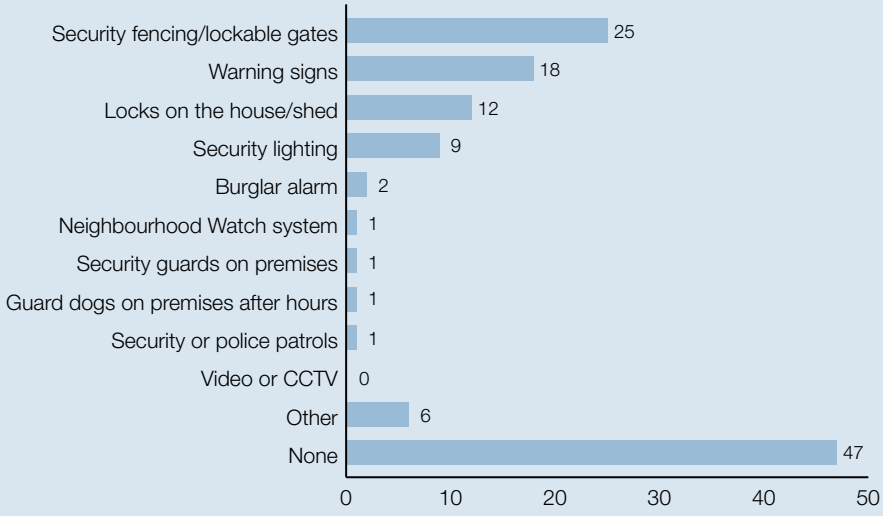
Expenditure by builders in urban areas was higher than elsewhere, reflecting their higher risks. Builders who mainly worked in CBDs, inner-city suburbs and outer suburbs spent on average about three times more than builders in rural areas (Table 11, $F(5)=2.67$, $p<0.05$).

A snapshot of crime prevention measures employed by theft victims

Victims of theft were asked whether any security measures were installed at the time of the most recent incident. Nearly half (47%) stated that no security measures had been in use at the time. Some other obvious precautions were also missing. For instance, serial numbers had been recorded for only 34 percent of the stolen whitegoods and 22 percent of stolen heating/hot water systems.

Half the victims had used some kind of security measure; for example, 25 percent had used security fencing and a further 18 percent had used warning signs. Other measures included locks on the building/shed (12%) and security lighting (9%). A small percentage of theft victims had used some form of surveillance, such as security guards (1%; Figure 17). The percentage of victims with no security at the time of theft (47%) was larger than the percentage of all builders who said they had no security measures regularly in use at the beginning of 2002 (9%). However, not much should be read into this as the list of security measures allowed for the regularly in use question was much longer than the list asked of victims, and therefore the percentage with none will inevitably be smaller.

Figure 17: Types of crime prevention measures in place during most recent incident of theft (percent)



Note: n=733 (weighted n=10,398)

Multiple responses were possible with this question. Percentages were calculated out of the total number of residential builders who had been victims of theft.

Source: AIC, Theft and vandalism at residential building sites [computer file]

Predictors of victimisation

Sixty-one percent of residential builders had not experienced any incidents of theft or vandalism, while 39 percent had experienced theft and/or vandalism in 2002. Two-thirds of the victims were repeat victims. Why then, were some residential builders more susceptible than others? Logistic regression analyses were conducted to assess this. This takes into account the independent effect of different factors, bearing in mind that any one risk factor (e.g. business turnover) may itself be associated with another (e.g. the location of work). The values for the so-called dependent variable of victimisation were 0 for a non-victim and 1 for a victim. Separate analyses were done for theft and vandalism. The following four predictors were entered into each logistic analysis:

- business turnover
- the location of work
- the total number of crime prevention measures regularly employed at the beginning of 2002
- the amount of money invested on crime prevention measures during 2002.

Table 12: Logistic regression analysis predicting theft victimisation

Variable	β	SE	Wald	Odds ratio
Business turnover > $1 million (yes=1, no=0)	1.168**	0.032	1,341.239	3.216
Worked at building sites mainly located in urban areas (yes=1, no=0)	0.664**	0.028	558.248	1.942
Number of security measures regularly employed at start of study period	0.103**	0.007	217.095	1.108
Money spent on crime prevention during study period (spent=1, not spent=0)	0.797**	0.032	628.818	2.219
Constant	-2.158			
Model X^2 (sample)	335.88	4df	p<0.001	
Model X^2 (weighted)	4,268.604	4df	p<0.001	
Negelkerke R square	0.199			

Note: n=1,679 (weighted n=27,697)

** Statistically significant at p<0.001

Source: AIC, Theft and vandalism at residential building sites [computer file]

Table 13: Logistic regression analysis predicting vandalism victimisation

Variable	β	SE	Wald	Odds ratio
Business turnover > $1 million (yes=1, no=0)	1.178**	0.034	1,189.763	3.247
Worked at building sites mainly located in urban areas (yes=1, no=0)	0.515**	0.033	246.562	1.674
Number of security measures regularly employed at start of study period	0.179**	0.008	493.344	1.196
Money spent on crime prevention during study period (spent=1, not spent=0)	0.553**	0.038	217.020	1.738
Constant	-3.003			
Model X^2 (sample)	252.89	4df	p<0.001	
Model X^2 (weighted)	3,430.291	4df	p<0.001	
Negelkerke R square	0.199			

Note: n=1,679 (weighted n=27,699)

** Statistically significant at p<0.001

Source: AIC, Theft and vandalism at residential building sites [computer file]

The main factor for both theft and vandalism that appears to be associated with the likelihood of victimisation is business turnover. Tables 12 and 13 present the unstandardised regression coefficients (ß), standard errors of ß, Wald statistics, odds ratios and their level of significance for the analysis. In predicting theft victimisation (Table 12), a test of the full model

with all four predictors against a constant-only model was statistically significant in predicting theft victimisation ($X^2(4)=4,268.604$, $p<0.001$). Although turnover was most strongly associated with risk, all of the other three variables (location of work, security measures employed at the beginning of 2002 and money spent on crime prevention in 2002) also made a statistically significant contribution.

Residential builders with an annual turnover of $1m or more are about three times more likely to experience theft than residential builders with annual turnover of less than $1m. Builders working in urban areas were nearly twice as likely to be victimised. Those with more security devices in place at the beginning of 2002 also had higher victimisation levels, as did those who spent more on security in 2002. While, on the face of it, this goes against the notion that better security is effective, there are more judicious conclusions taken up in the section.

Very similar results were obtained in predicting vandalism victimisation, as seen in Table 13. A test of the full model with all four predictors was statistically significant in predicting victimisation ($X^2(4)= 3,430.291$, $p<0.001$). Again, businesses with a high turnover were about three times more likely to experience vandalism than others. Building sites located in urban areas were also about 1.6 times more likely to have an incident of vandalism than those in other areas. There was also the same positive relationship between victimisation and the total number of security measures regularly employed at the beginning of 2002, and the amount of money invested in security in 2002.

Discussion and conclusion

The results of this study show that one in four residential builders were affected by theft and/or vandalism on building sites during 2002, and that two-thirds of those victimised experienced more than one incident – or just over one in 10 builders overall. Median total losses for victims were $500 for the most recent and presumably typical incident of theft, and $300 for vandalism. Net losses will have been smaller than this, although not much more so, since relatively few victims claimed on insurance. Moreover, indirect losses need to be added. Relatively few victims reported indirect losses, but those who did gave median values similar to direct losses. There are also the costs of insurance premiums and security measures, whether as a one-off or ongoing costs.

While about three-quarters of builders were insured for theft and vandalism, the vast majority who became victims did not make a claim. This was because of the paperwork involved, and the fact that the losses involved were not high enough to jeopardise their premium rating. Nonetheless, uncompensated costs, even if small for individual incidents, add to the overall financial burden of crime for builders. This adds to construction costs and subsequent housing prices. It has been estimated, for example, that the average price of a new home increases by one percent as a result of building site thefts (CPV 2003a).

Many previous studies have concentrated on the involvement of professional or organised criminals in targeted and well-organised theft of heavy plant and equipment from building sites. This study looked wider and found that only one percent of theft victims reported that heavy plant and equipment was stolen during 2002. The much greater volume of thefts and incidents of vandalism seemed more opportunistic in nature and involved non-specialised and portable items (Jeffery 2001). Thus, six in 10 victims reported that raw materials were stolen and nearly half mentioned hand-held tools. The opportunistic nature of theft and vandalism is further evidenced by most theft victims thinking that employees of other firms and locals and/or neighbours were responsible, as opposed to regular or organised criminals. Moreover, consistent with previous studies (Abru 2002; Gladstone 1978; Goldstein 1996), the majority of victims of vandalism in this study attributed it to local youths.

Previous research suggests that residential and industrial sites in urban areas are at high risk of victimisation from theft (Jeffery 2001; Smith & Walmsley 1999). Vandalism tends to occur in places that are easily accessible (Goldstein 1996). The findings here confirm that builders who work at sites in urban areas (CBD, inner-city suburbs and outer suburbs) were about twice as likely to fall victim to both theft and vandalism as builders working in more remote locations. The present study did not look at other probable factors that could influence risk, such as site accessibility, the socioeconomic profile of the areas of building activity or population density. These merit further attention.

The finding that builders with the largest business turnover were most at risk is not surprising given that they would be engaged in more building projects and have more exposable assets. On the face of it, it is more surprising that the regression analysis showed that

victims were more likely than non-victims to have had more security measures in place at the beginning of the year, and to have spent more in the year on security measures. This can be explained in a number of ways.

- Victims might have invested more in additional security in 2002 simply because they had been victimised. Barclay and Donnermeyer (2002: 57), in their study on theft and vandalism on farms in Australia, argued that 'the precautionary actions were more of a reaction to having experienced crime rather than a way of reducing victimisation'. Similar results have been found in relation to householders who experience crime.
- Residential builders who had a range of crime prevention measures in place at the beginning of 2002 may have been prior victims. Their use of security measures could actually have reduced incidents in 2002 compared with incidents experienced in previous years. A longitudinal study across a range of locations would be necessary to examine the relationship between crime prevention measures and repeat victimisation.
- The use of certain security measures may be seen by perpetrators as a challenge or imply a history of the premises being targeted, thereby encouraging perpetrators to offend (Barker & Bridgeman 1994).
- The quality of security measures employed may simply be inadequate for the task when there is a strong local appetite for theft and vandalism.

The development and implementation of appropriate crime prevention measures can protect builders from theft and vandalism, especially if they are well thought out. Barker and Bridgeman (1994: 37) argued:

> The most effective preventive strategies use a combination of measures, each designed to reinforce one another. In selecting measures, it is not sufficient to base decisions solely on evidence of past success; what works in one situation may not work in another.

This study suggests that situational prevention measures should be the starting point, with a particular focus on:

- paying better attention to the security of raw materials, tools and appliances that are frequently targeted in thefts from building sites. While these need to be readily accessible to builders themselves and are often on open sites, builders need to weigh their own convenience better against the risk posed
- considering the cost effectiveness of employing after hours security. This will be an expensive option, but greater awareness of the fact that most incidents take place in the evening or at night might sway decisions
- improving door and window security (as most appliances are stolen at lock-up stage)
- being particularly attentive to the security of building sites in urban areas

- seeking police help in targeting local youths (who are believed to commit the majority of vandalism incidents).

Following from this, the specific crime prevention measures below could help prevent theft and vandalism on building sites.

Target removal

Protecting raw materials is relatively difficult, as these are often taken from open sites, as noted, and need to be accessible to builders working to tight deadlines. However, delaying the delivery of raw materials until immediately before use, preferably on the day they will be used, would help. It would also help if high-risk tools and equipment (unspecialised and portable ones) were removed from building sites after use.

Identifying property

Simple and inexpensive measures that can be taken to effectively protect tools and appliances include keeping good records of serial or identification numbers, and permanently marking equipment for identification.

Surveillance devices

Most thefts from building sites occur when houses are sufficiently complete to be able to lock them up. Thus, security measures applicable to residential burglary should come into play. It would make good sense to ensure that household security systems offered to new owners are installed and operational as early as practicable. On the basis of the Crime Prevention Victoria (CPV) work, Lee (2002) recommended that CCTV and site alarms should be fully operational during the construction process. CCTV systems in particular can be costly, especially if monitored, but for those at highest risk they may prove cost-effective, especially if they can be reused on different sites (Barker & Bridgeman 1994).

Natural surveillance

CPV also suggests that improving street and curtilege lighting could be effective in reducing theft and vandalism by making sites more visible at night. They also endorse involving local residents in monitoring and reporting suspicious activities. CPV initiated a project in the City

of Casey local government area to increase community awareness of the risks of building site crime and encourage the reporting of suspicious activities. Given that most incidents of vandalism are thought to be committed by local youths in the evening at weekends, specifically enlisting Neighbourhood Watch groups to monitor the activities of local youths may also help.

Cooperation between government, community and industry

Cooperation between policymakers, the police, communities and the building industry is necessary for effective prevention strategies. Modern communication technologies can be engaged for this purpose. CPV, for example, has an interactive website – the virtual building site – which gives generic tips on reducing risks of building site theft (CPV 2003a). The website recommends using a number of crime prevention measures, such as warning signs, delaying delivery and installation of appliances and materials, and marking all materials and appliances. It also recommends liaison with the local council and neighbours (CPV 2003b).

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All URLs were correct at May 2007

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