

# **A Review of the Literature on Mitigation Strategies for Vandalism in Rail Environments**

Ms Amy Killen<sup>1,2</sup>, Dr Selby Coxon<sup>1</sup>, Dr Robbie Napper<sup>1</sup>

<sup>1</sup> Mobility Design Lab, Faculty of Art, Design and Architecture, Monash University, Melbourne, Australia.

<sup>2</sup> Sustainable and Effective Public Transport: Graduate Research Industry Project (SEPT-GRIP), Monash University, Melbourne, Australia.

Email for correspondence: amy.killen@monash.edu

## **Abstract**

Vandalism on rail networks has a detrimental impact on services, with the resulting disruption to customers contributing to a negative journey experience. Beyond the social costs, the removal of vandalism from rail networks also amounts to extensive financial costs for its operators. The aim of this review is to provide an analysis of various social and technical deterrents to vandalism. Prominent international and local cases in relation to mitigation strategies were reviewed, with a focus on the areas of maintenance, materials and design, technology, authority and law, community involvement and holistic approaches. The accompanying motivations and objectives of vandalism behaviour were also explored through the lens of its cultural environment. Approaches embedded in a holistic framework, partnered with a core understanding of underlying motivations and culture, yielded the most effective results in reducing vandalism. Those approaches tailored towards targeted, long-term results also provided the most potential for financially viable solutions. Asset protection proved to be key in addressing issues surrounding expenditure, perception, safety and contractual obligations of rail operators. Future research should, therefore, investigate what solutions can be devised to protect essential rail assets most at risk. Embedding this research in a core understanding of the motivations and cultural implications will assist in ensuring the successful mitigation of vandalism behaviour in rail environments.

## **1. Introduction**

Public transport services encompass complex and diverse infrastructure networks. These services play an important social role by ensuring access to transport regardless of demographics such as age, income or disabilities. Vandalism has a substantial impact on the effective operation of such services, contributing to a negative journey experience and discouraging future utilisation of the network (Carr & Spring, 1993; Easteal & Wilson, 1991). Addressing acts of vandalism significantly increases rail expenditure, with costs not simply limited to the maintenance involved. Resulting delays or cancellations also contribute to a significant loss of revenue. Beyond the obvious economic and social costs, the human costs are also cause for concern. Rail environments present legitimate dangers, putting not only the perpetrators trespassing at risk but also the public and staff who attempt to intervene. Strategies to reduce vandalism within rail environments, therefore, have far-reaching operational, financial and social benefits. However, the introduction of more advanced mitigation techniques has not significantly contributed to a reduction in vandalism rates (Thompson et al., 2012). Thus there is a clear need to critically review literature detailing deterrent programs so that more effective prevention and minimisation strategies can be developed.

The aim of this review is to provide an analysis of various social and technical deterrents to vandalism. Firstly, the terminology in reference to vandalism and graffiti is defined, as this can

often be conflated within the literature. The extent of this behaviour in the context of rail environments is then examined, with the various motivations and cultural dynamics also explored. Case studies are then reviewed under six subject areas recurrently encountered when researching mitigation strategies. These include:

- maintenance
- materials and design
- technology
- authority and law
- community involvement
- holistic approaches (which incorporate elements from a variety of these central themes)

Both local and international cases have been reviewed with their respective effectiveness in reducing vandalism measured. Strategies emphasising future direction for mitigation programs have then been evaluated with the strengths and limitations of their supporting research approach and findings critically reviewed.

## 2. The nature and scope of the problem

### 2.1 Definitions

When researching vandalism and graffiti, it is beneficial to explore the differences in terminology. A widely referenced definition of vandalism has been described by van Vliet (1992, p.32) as the 'wilful damage to or destruction of property owned by others'. Graffiti, however, involves the unauthorised defacement of public or private property. (Cohen, 1973; Craw, Leland, Bussell, Munday & Walsh, 2006; Grant, 1996; Halsey & Young, 2006; Lachmann, 1988). In the public consciousness, negative opinion is often drawn in relation to undecipherable tags which many consider a social crime or an act of youthful vandalism (Halsey & Young 2002; Halsey & Young, 2006). Sanctioned graffiti, which is often well received by the public, further confuses the relationship between graffiti and vandalism whilst also creating a conceptual distinction between 'graffiti as crime' and 'graffiti as cultural expression' (Alvi, Schwartz, DeKeseredy, & Maume, 2001; King & Setter, 2003). Although graffiti on rail owned property can be considered as a certain type of vandalism, there has been limited research studying whether those committing acts of graffiti also commit more destructive acts of vandalism such as seat slashing or window etching.

**Figure 1. 'Graffiti as vandalism' vs 'graffiti as art' (author's own images)**



What differentiates a graffitist from a vandal is not well documented and can often come down to the opinion of the individual viewing the effects and under what conditions. Street art for example, although a form of vandalism, is considered more artistic and less destructive when

compared to other acts of vandalism, such as seat slashing. Graffiti is, therefore, best understood as a complex interaction between society's infrastructures and human behaviour whilst considered within its environmental context. Although graffiti can be labelled as a form of vandalism, the connection is problematic, with further research required in this field of study. However, for the purposes of this literature review, graffiti will be considered under the umbrella of vandalism when discussing mitigations strategies in the context of the rail environment. The rail environment will be defined in general terms as any combination of the following:

- "the area located in, below and above a railway corridor
- the area located on, below and above the 25-metre-wide strip of land running along each side of a railway corridor" (Growth Management Queensland, 2010)

## **2.2 Costs**

The social costs of vandalism in rail environments are considerable, with structural assets devoid of damage viewed by the community as indicators of safety and public order (Halsey & Young, 2006). The presence of vandalism places feelings of unease upon the user's consciousness along with the perception that there is no ownership or control of the area (Wilson & Kelling, 1982). Nathan Glazer, a prominent sociologist, summarizes this sentiment stating that, "the proliferation of graffiti, even when not obscene, confronts the subway rider with the inescapable knowledge that the environment he must endure for an hour or more a day is uncontrolled and uncontrollable, and that anyone can invade it to do whatever damage and mischief the mind suggests" (Wilson & Kelling, 1982). Beyond lost revenue through a damaged public perception and the resulting reduction in ridership, the removal of vandalism from rail networks amounts to extensive financial costs for its operators. Rail Corporation New South Wales (RailCorp) has estimated the cost of vandalism on its network to be \$30.9 million for 2012-13, a rise of 17.5% from the previous year (\$26.3 million). These figures demonstrate the escalating nature of vandalism within rail environments.

## **3. Culture**

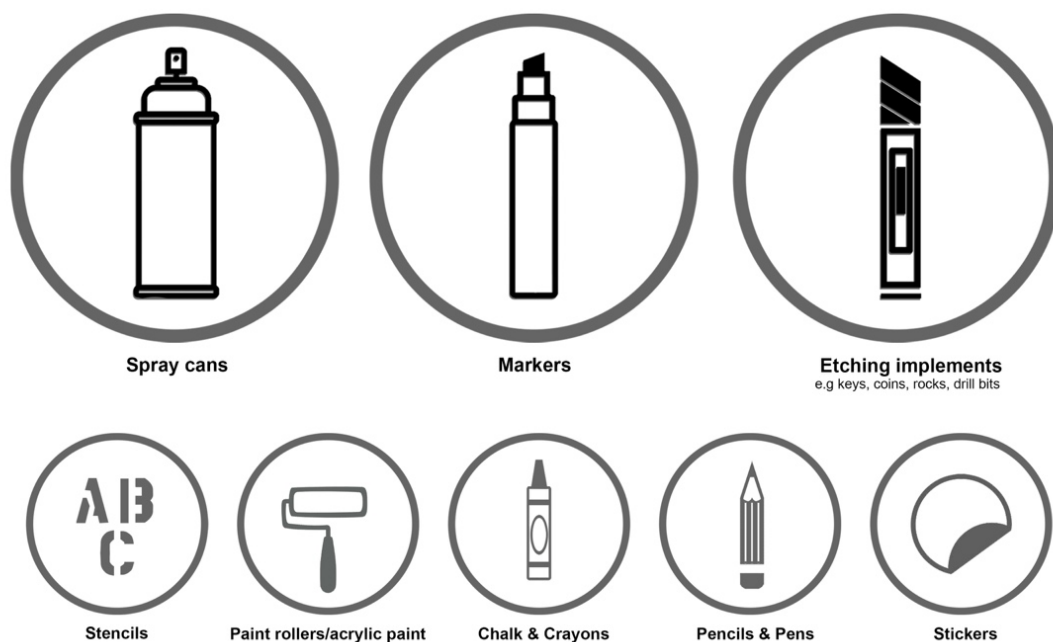
### **3.1 Graffiti networks**

The need to explore vandalism culture has been highlighted by numerous studies when attempting to devise effective, locality specific deterrence methods. Research undertaken in 2009 by the Crime Prevention Division of the New South Wales Attorney General's Department (CPD) found that graffiti "crew" networks are an active part of vandalism culture in Australia. Approximately one-third of the 52 participants interviewed noted being a member, with these groups ranging from 10 to 40 people. Wakeland (2016) notes that notoriety within graffitiists is of high importance, with the number of offences as well as the danger and associated risks of the environment increasing their status among peers. Fuller, O'Brien and Hope (2003) reported that vandals were often "pushed into" offending in places linked to graffiti culture, including those of increased risk and danger or those providing a "faceless" victim such as rail systems. To further complicate minimisation strategies, recent advancements in technology have seen the presence of graffiti gangs shifting to an online platform, with notoriety and status seeking from peers gained through their work being uploaded to websites and forums. Instant gratification and "agent" recognition via the internet has severely limited the effectiveness of deterrent methods commonly in practice (Economic Research Centre, 2003). As concluded by Thompson et al. (2012), further research is required to study the potential positive effects of reducing vandalism in the "real world" by transitioning it to an online platform and therefore altering its culture.

## 3.2 The offenders

When discussing vandalism culture, questions surround the characteristics of perpetrators involved. In a study by Taylor, Marais & Cottman (2012), the Western Australian Police Information Management System database was used to extract the three-year “offending histories” of 798 graffiti artists. Of the recorded data, 65.5% were male and 11.3% were female (the gender was not identified for the remaining 23.2%). The mean age was 15.86 years, with the largest group (64.4%) being adolescents at the time of their first reported incidence of graffiti. It has also been estimated by the British Transport Police that the peak time for activity is between 4 pm and 7 pm, which directly correlates to school timetables of young vandals (Stafford & Pettersson 2003). Research conducted among graffiti writers in South Australia found that the majority became involved through friends or acquaintances. Younger vandals were seen to engage primarily in tagging (a word, symbol or picture representing a person or group) and older vandals engaged most in pieces (a painting, short for ‘masterpiece’) (Halsey and Young 2002). CPD (2009) notes the most reported graffiti tools in order of prevalence included spray paint, marker pens and etching implements, followed by a number of lesser-used implements as shown in Figure 1. Half of the participants interviewed had been engaging in graffiti for three or more years which aligns with Halsey and Young’s research, reporting the average length of participation in vandalism to be 3.92 years.

**Figure 2. Adapted from The Crime Prevention Division of the New South Wales Attorney General’s Department (CPD) 2009 study**



## 4. Motivations of vandalism

### 4.1 Typology

The most commonly referenced vandalism typology was developed by Stanley Cohen in 1971. This typology has been cited by numerous studies, including Fisher and Baron’s “An Equity-Based Model of Vandalism” (1982), Goldstein’s, “Controlling Vandalism: The Person-Environment Duet” (1997) as well as Wolff’s more recent 2011 study “The Writing on the Wall: Graffiti, Vandalism, and Social Expression.” Cohen’s typology comprises of six sub-types of vandalism and each of these is attributed to different motivations as follows:

1. Acquisitive vandalism: damage committed in order to obtain property or money

2. Tactical vandalism: using vandalism to achieve other goals such as sabotaging a machine to force an extended rest period at work
3. Ideological vandalism: vandalism for the sake of voicing a social, political or other 'cause'
4. Vindictive vandalism: damage done to enact revenge, for example, against a perceived injustice from someone in authority (a School Principal, for example)
5. Play vandalism: vandalism performed in the context of 'play', such as who can hit the street lamp the most times?
6. Malicious vandalism: damage used to express rage or frustration, often directed at property perceived to be 'middle class'

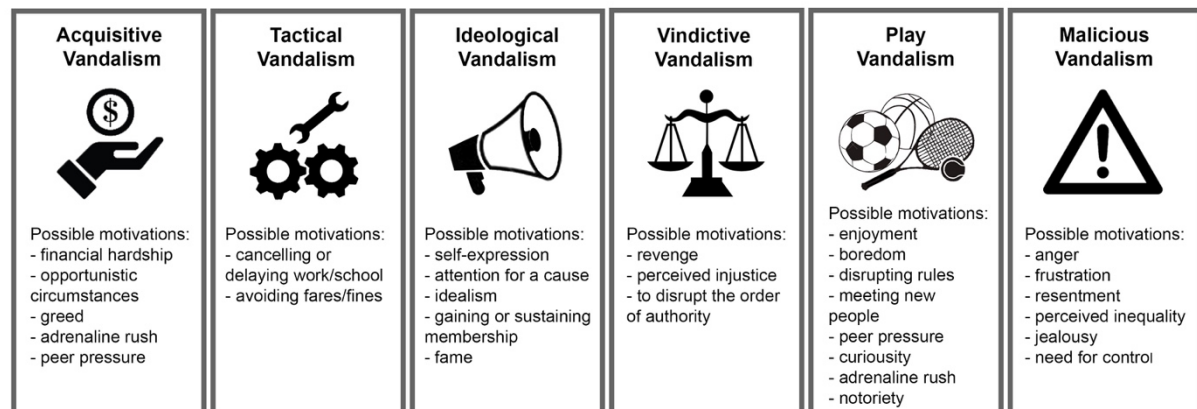
An opposing view to Cohen's typology includes Weinmayer's (1969) assessment that vandalism exists in the context of buildings such as schools as well as other public facilities (including parks and their equipment) rather than existing in the context of the person. Weinmayer, therefore, proposes a contrasting set of vandalism subtypes including overuse, conflict, curiosity, leverage, deleterious, irresistible temptation, and "no-other-way-to-do-it" vandalism.

The common types of rail vandalism include play, malicious and other innocuous forms, with the motivations behind these behaviours not obvious in comparison to its counterparts. Instead, studies suggest that there is a heterogeneity of motivations for these behaviours which are often inherent in young people (Wilson & Healy, 1987). Intersecting Cohen's typology of vandalism, a further five motivations have been identified by researchers:

1. gaining or sustaining membership within a 'deviant' group through anti-social acts that reinforce group membership
2. self-esteem
3. self-expression
4. to disrupt the order of authority
5. enjoyment and the rush associated with the illegality of the behaviour (Bandaranaike, 2001; Callinan, 2002; Craw et al. 2006)

Sutton's research (1987, p.4) extends on dot point one, by identifying "peer status motivated vandalism" as an important sub-type. The more recent study by CPD (2009) similarly found that competition and social reasons such as meeting new people can also serve as a motivator. Some of the participants in this study noted preferring friends accompanying them for safety while simultaneously stating that they took part in vandalism for the adrenaline rush. The inconsistency is noted, with researchers asking the question "why are risk seekers bringing friends along to minimise the risk?". Ultimately it was concluded that recognition was the actual motivator. They derived satisfaction from others viewing them taking such risks, rather than the risk itself. Understanding the differing motivations behind vandalism is, therefore, a complex research area but plays a key role when devising targeted responses to this behaviour.

**Figure 3. Authors synthesis. Adopted from Cohen 1971**



## 5. Deterrence methods

This section of the review will analyse various deterrent methods by evaluating cases both locally and globally. As discussed, six categories surrounding minimisation strategies have been identified throughout the literature for discussion. These include; maintenance, materials and design, technology, authority and law, community involvement as well as holistic approaches. When reviewing the success and failures of certain vandalism abatement programs, it is important to consider the limitations of this research method. The cases being reviewed are specific to certain localities, each with varying social and cultural specificities as well as distinct differences in the transport networks. Consequently, strategies need to be tailored to the locations in which the deterrent methods are being implemented. This approach is supported by researchers such as Spooner (2003), Weisel (2002), White (1998) and van Vliet (1992) who emphasise that social mapping must occur, where the local context of an area is taken into account in order to successfully address local issues.

### 5.1 Maintenance

#### 5.1.1 *Rapid removal*

Rapid removal is a widely accepted practice in attempts to deter vandalism. This approach is based on the premise that vandals are discouraged to see their work removed quickly and without recognition. This theory was first popularised by Wilson and Keeling's (1982) 'Broken Windows' article and later adopted by the transport sector. This article discusses the social phenomenon whereby if a window in a building is broken and not quickly repaired, the remaining windows will soon also be broken. When examined at the community level, it can be argued that social disorder and crime are intricately linked. Leaving the window unrepaired signals that there is no ownership of the area and breaking further windows is of no consequence. Vandalism has, therefore, become sanctioned and thus increases in regularity and salience. Wilson and Keeling (1982, p.3) argue that "vandalism can occur anywhere once communal barriers—the sense of mutual regard and the obligations of civility—are lowered by actions that seem to signal that "no one cares"". An examination of the Broken Windows theory has been carried out by multiple researchers including Skogan's (1990) testing in over 40 cities as well as Keizer, Lindenberg and Steg (2008) who tested this theory in a series of six experiments. These studies revealed that environments subjected to graffiti encourage occurrences of "disorderly behaviour". It can, therefore, be observed that features of the physical environment can either encourage or deter acts of vandalism (Cozens, 2002).

"Looking Beyond the Symptoms" author Kevin White argues that "buffing", which is the covering or removal of graffiti by authorities is "an accepted aspect of graffiti culture and the idea that rapid removal discourages vandals is, therefore, a misconception" (2003, p. 2). Although rapid removal may be an effective solution to tackling graffiti, eradicating the activity in full may be difficult due to the instant gratification experienced by perpetrators. The financial costs involved with the rapid removal process can also be exceptionally high as the employment of full-time cleaning units are required (Offler, Thompson, Hirsch, Thomas & Dawson, 2009; Thompson et al., 2012). An additional risk includes that of vandals moving their attention to different areas or mediums (Craw et al., 2006). "Quick and dirty" forms of vandalism along with a change in location may also occur (Haworth, Bruce & Iveson, 2013, p.53). This behaviour was observed in the Economic Research Centre's 2003 report which found that the timely removal of graffiti by rail authorities in France resulted in vandals shifting their attention to the etching of windows. This observation demonstrates that graffiti, in particular, is an easily adaptable form of vandalism and abatement approaches need to understand these complexities when attempting to develop effective strategies. Multiple sources agree that rapid removal alone is not an effective deterrent method but can be when



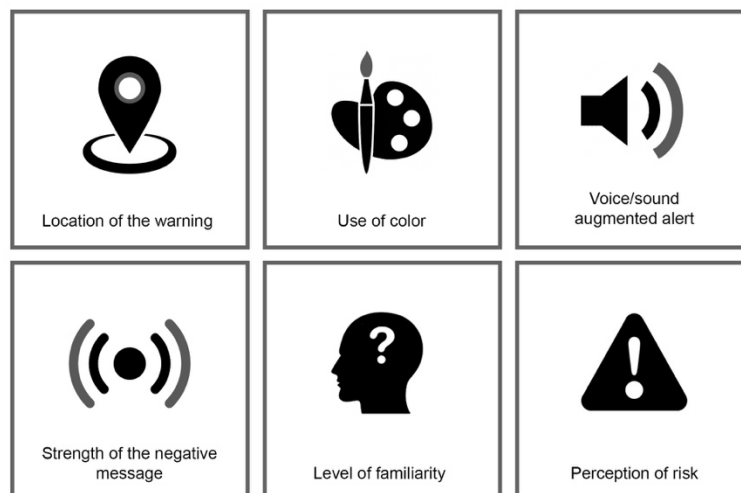
embedded in a holistic framework (Armitage, 2002; Brown, 1997; Smith & Clarke, 2000; van Vliet, 1992; Walkom, 2009; Weisel, 2002; and White, 2003)

## 5.2 Materials and design

### 5.2.1 Prevention

Materiality and design decisions can significantly reduce maintenance efforts and costs for rail operators. In “Preventing Graffiti and Vandalism”, Geason (1989) discusses altering the physical environment, which centres around reducing opportunities for potential offenders rather than addressing the underlying motivations of the perpetrator. This can be described as “opportunity reduction” as well as “target hardening” and includes approaches such as using vandal-proof materials that are resistant to scratching or marking as well as incorporating better design solutions to reduce opportunities for cover. As described by Geason (1989, p.2), “the attraction of this approach is that it can work in the short term while researchers and policy makers work on longer-term solutions to the problem of crime.” Design strategy also plays an important role in the creation and communication of warnings and associated penalties. Beyond the language or images used, Silver and Braun (1999) have devised a list of 6 recommendations for effectively communicating consequences for vandalism as shown in figure 4 below.

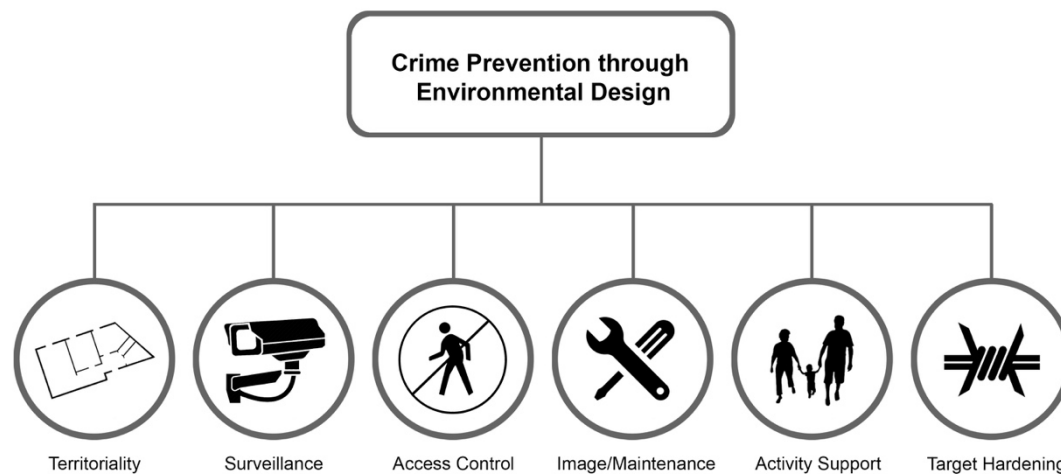
**Figure 4. Adopted from Silver and Braun 1999**



### 5.2.2 Crime prevention through environmental design (CPTED)

A comprehensive approach to improving the physical layout and environment of railway stations and surroundings has also been adopted by various rail authorities in attempts to deter vandalism. Crime prevention through environmental design (CPTED) maintains that “the proper design and effective use of the built environment can lead to a reduction in the fear and incidence of crime, and an improvement in the quality of life” (Crowe, 2000, p.46). This framework highlights that there are four dimensions to any crime, including the law, offender, target and location. Cozens, Saville and Hillier (2005) assert that place-based crime prevention strategies focus on these dimensions, noting that the spatial distribution of the offences and offenders are not random. Moffat (1983) has proposed that there are six characteristics of first-generation CPTED concepts, as shown below:

**Figure 5. Adopted from Moffat 1983**



Geason (1989, p.9) supports the use of CPTED for tackling vandalism by stating, "prevention of vandalism and graffiti basically comes down to the same principles as all crime prevention through environmental design – controlling access, fostering a sense of ownership, using the best vandal-proof materials affordable, good management practices, quick maintenance, and maximising natural and formal surveillance of vulnerable sites". However, Van Vliet (1992) suggests that CPTED techniques are not sufficient in completely preventing illicit activity. Underlying social factors also need to be targeted to achieve an effective and stable decline in the rate of vandalism. The attraction of changing the environment includes reducing potential opportunities for the delinquent rather than trying to alter their underlying perceptions, attitudes and motivation. This approach could, therefore, provide a short-term solution to the problem and during this period, a long-term solution could be devised by researchers and those developing policies.

## **5.3 Technology**

### **5.3.1 CCTV**

Technological advances have provided the rail industry with innovative approaches to deterring vandalism within their environments. Arguably the most commonly used piece of technology is that of closed-circuit television (CCTV), which raises two important questions. First, is the role of CCTV in prevention or detection? Second, what is its actual effectiveness in reducing vandalism rates? Installing CCTV cameras to deter criminal behaviour may be referred to as primary crime prevention (Brantingham & Faust, 1976) or as situational crime prevention (Clarke, 1995). Essentially, this type of prevention focuses on the crime event and how to reduce opportunities for committing offences. In terms of effectiveness, it can be argued that CCTV footage provides a better "quality of arrests" and increases the likelihood of guilty pleas in court (Wilson & Sutton, 2003). However, the failure of authorities in apprehending individuals inevitably decreases the effectiveness of CCTV cameras in deterring crime over time (Brown, 1997). When innovative solutions to crime prevention are first introduced and publicised, a level of uncertainty is created for the offender. Over time, and with the development of new criminal techniques, confidence returns to the perpetrator who resumes committing offences (Tilley, 1997). Armitage (2002) strengthens the view that CCTV can do little to address crime prevention in the long term due to evidence suggesting the benefits fade over time, with possible displacement or a shift to other forms of crime occurring.



### **5.3.2 Information technology (IT) platforms**

Beyond the use of CCTV, advanced IT platforms or incorporated mobile technology can be used to record and plot occurrences of graffiti by geo-mapping “hotspots”. The use of geographical information systems (GIS) helps to identify patterns, frequency and graffiti targets via incidents recorded by rail authorities. Haworth, Bruce and Iveson (2013) analysed spatio-temporal trends in graffiti across inner-city Sydney, New South Wales by geo-coding graffiti removal incidents over a period of six months. Trend analysis, coupled with spatial cluster activity, resulted in a model of graffiti distribution being created which identified various “hotspots”. Research by CPD (2009) also found that most participants reported doing graffiti in the same area each time which was often their local suburb, train station/line or a particular landmark. The motive and type of graffiti, however, can influence a vandals’ decision to travel further distances for particular graffiti sites. For example, taggers reported targeting highly visible areas, whereas those partaking in pieces reported travelling to areas where only other graffitiists frequent. The ability to map this travel, therefore, provides valuable insight into a vandals’ behaviour. However, such technology (inclusive of CCTV) can be considered as reactive monitoring in most cases, with this responsive nature forming the basis for criticism on its effectiveness in reducing vandalism. Innovative technology solutions altering the platform from a reactive to immediate response prove potential areas for future research.

## **5.4 Authority and law enforcement**

### **5.4.1 Punitive measures**

Increasing fines and punitive measures such as jail terms are law enforcement centred approaches to reducing vandalism in the rail environment. A widely trialled measure includes a form of restitution through vandals cleaning the graffiti themselves, thus allowing the perpetrator to understand the difficulty faced by cleaning staff. Public embarrassment also plays a role in its effectiveness, whilst maintenance costs are also minimised. Scott (1989) notes that while this technique has been successful in deterring perpetrators from re-offending, further research is required to transition this method to that of passenger railways. An opposing approach to increasing fines and disciplinary measures is that of offering rewards for good behaviour, known as positive reinforcement. An example of this includes The London Borough of Tower Hamlets Graffiti Project which has been in effect since 1997. The program coordinator develops connections with local agencies in order to develop activities such as drama classes, IT training and various workshops. The program also offers activity based incentives for those who partake in removing graffiti from areas selected by the project (Armitage, 2002a). Providing these rewards not only offers enjoyment for the individual but also serves as a distraction from possible boredom which has been identified as a motivator of vandalism.

### **5.4.2 Legislation**

Another common minimisation technique includes the implementation of legislation restricting access to tools required by vandals. This includes the prohibition of spray can sales to persons under 18 years as well as requirements placed on retailers to store these items securely (White, 2003). Such bans were adopted by the NSW government in 2006, where restricted access was coupled with increased penalties (CPD, 2009). Previous New York Mayor Giuliani introduced similar legislation in 2001, where arrests for graffiti increased by 212% in the first year of implementation. However, CPD (2009) found that vandals were still able to access spray cans via the help of friends or family over the age of 18. It can also be argued that graffiti writers would inevitably find other tools if such a ban were in place. Geason (1989) supports this view, observing that when similar measures were adopted in Australia, offenders

transitioned to other tools and those over the age of 18 were unaffected by the legislation. Of particular concern, glass etching rose in frequency when access to tools used for tagging was restricted (Halsey & Young, 2002; Fleming 2003). As highlighted by Iveson (2007), such bans also risk an increase of anti-government sentiment and associated graffiti.

### 5.4.3 Human Based Security

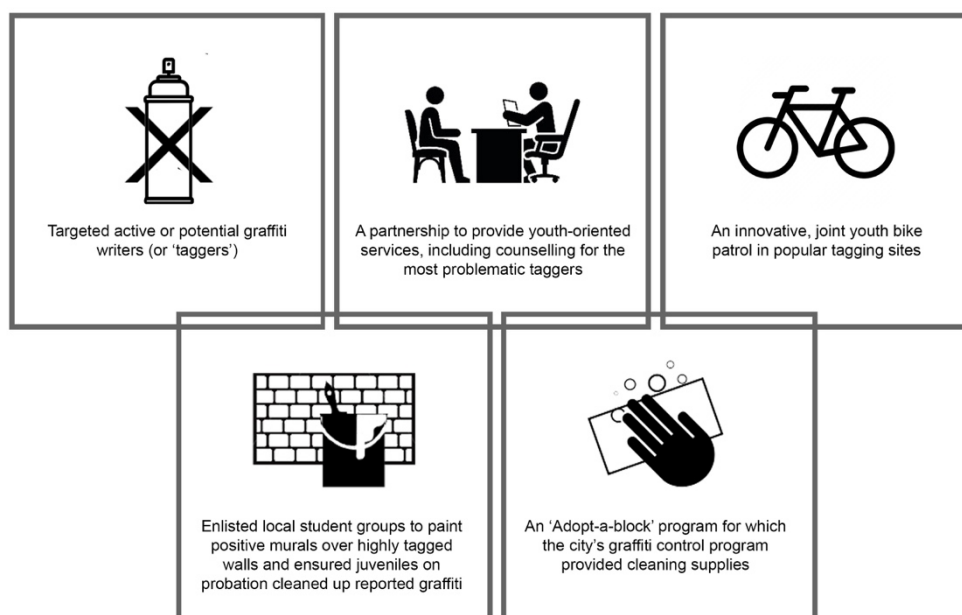
Beyond the role of technological security measures, an increase in human based authority figures attempts to deter vandalism on the rail network. Measures include improving patrol methods, employing young people to take part in surveillance and increasing the visibility and presence of staff on trains. These approaches have the added benefit of costing less than cleaning and repairing vandalised rail-owned property (Van Andel, 1989). In opposition to this initiative, a number of studies have found that visible security staff can increase occurrences of vandalism due to vandals' need for recognition (White, 2003). To combat this retaliation response, the use of plain clothes by staff has been recommended by Eck and Spelman (1987). This approach has been adopted by Connex South Eastern in the UK and resulted in a 40% reduction in the number of incidents as well as an estimated UK\$10,000 saved by rail authorities per week (Thompson et al. 2012). However, researchers also maintain that passengers report feeling safer when security staff are visible (Thompson 2011, Thompson et al. 2012). This paradox provides complications for rail authorities when attempting to reduce vandalism but also attempting to ensure their passengers feel safe. Studying how different security groups work together when managing incidences of vandalism may illuminate gaps in management policies and practices as well as potential communication breakdowns.

## 5.5 Community involvement

### 5.5.1 Enlisting community support

At a community level, initiatives designed to help abate vandalism on the rail network by enlisting public involvement have achieved significant results. Encouraging community support and ownership helps signal to vandals that the area is locally maintained. A widely referenced example of this approach is that of a program run in San Diego, United States, in 1999. This program can be viewed as an attempt to gain an emic understanding of perpetrators whilst engaging different levels of the community. This approach included a number of initiatives as shown below:

Figure 6. Adopted from Scott et al., 2007



When measuring the effectiveness of these techniques, it was found that there was a 90% reduction in reports of graffiti occurrences. A 30% reduction was also reported in relation to taggers re-offending when undergoing counselling. This approach has been described as an attempt to break down the “us vs them” dichotomy, where vandals are unable to view their actions as reciprocally affecting them. Thompson et al. (2012, p.1286) emphasise that “developing collaborative efforts can weaken the dichotomy such that an act of vandalism is understood as an act against one’s own community which is comprised of friends, family and ultimately, self”.

### **5.5.2 Early intervention**

Early intervention programs such as educating students and first-time offenders can have a significant impact on future decisions to engage in vandalism. Such programs have been adopted by a number of rail authorities, including the initiatives implemented in the Netherlands by the HALT Bureaux. An immediate response to first-time offenders between the ages of 12 and 18 was provided in the form of referral and interviews with local authorities. Consequences in the form of labour or money were then paid, with the young offender also expected to attend a number of educational sessions (Petterson & Stafford 2004). Another notable program of this nature was implemented in New South Wales (NSW) and was run by the Community Offender Services sector of the NSW Department of Corrective Services. The graffiti remediation scheme involved providing not for profit organisations with offenders’ time and labour for free (Durman, J., 2003). This program highlights the collaborative effort of councils joining with local agencies in attempts to eliminate vandalism (Holland, 2003; Yatawara & Paszek, 2010).

### **5.5.3 Legal graffiti walls/murals**

Another widely trialled community measure includes the introduction of legal graffiti walls or murals. Such areas are provided by councils as outlets for street art, with the aim of reducing illegal graffiti. This practice culminates in various community advantages such as taking ownership of the area and therefore investing in its upkeep. Recognition of talent and increased self-esteem can also be observed by the individuals involved (Halsey & Young 2002). Trialled by the “Hall of Fame project” in the Netherlands, this project saw a decline of graffiti in the inner city area, with a local survey revealing that the presence of graffiti did not make residents feel unsafe. Despite the reported success of projects such as these, the effectiveness of these practices has been widely debated in the literature. White (2003) notes that legal walls fail for the following reasons:

- facilitators can be sympathetic to illegal graffiti and use the project to showcase their own work
- divisions in the local graffiti community occurs
- murals potentially introduce aerosol to young people for the first time
- mural become "shrines" which increases graffiti in the area

A widely noted argument for the implementation of legal graffiti is the idea that the artwork will not be defaced due to the respect associated with tagging culture (Craw et al. 2006; Callinan 2002). However, Craw (2006) also argues that graffiti artists’ attention may instead shift towards a nearby location as observed in Taylor and Marais’ 2009 study in Perth Australia where graffiti reduced on a newly installed artwork site but spiked in surrounding areas. Promoting legal graffiti can also do little to deter those creating graffiti due to the thrill of law-breaking involved (Callinan 2002). Each method of community involvement, therefore, needs to be rooted in an emic understanding of that community’s culture, beliefs and values in order to be effective.

## 5.6 Holistic approach

Approaches embedded in a holistic framework are highlighted as increasing the likelihood of that program's success (White 2003). Such approaches acknowledge that vandalism behaviour is a multifaceted and complex issue. As suggested by Bandaranaike when discussing Ferri's (1999) research, 'while the physical environment may determine the place of crime, the social environment explains it' (2001, p. 11). A widely referenced Australian initiative is that of Bankstown, NSW as presented at the Graffiti and Disorder Conference in Brisbane, 2003. The paper's author, Kevin White, advised to "look beyond popular strategies and target the culture of graffiti, not simply the symptoms" (p. 4).

Bankstown's 9 step holistic graffiti minimisation strategy included:

1. Enlisting support from external agencies
2. Creation of an incident and photographic database
3. Remove piecing wall opportunities
4. Reduce access to potential surfaces for graffiti
5. Monitor crew activity on targeted areas
6. Establish a colour palette for streamlined maintenance
7. Remove remaining graffiti
8. Restrict the sale of spray cans to people under the age of 18
9. Build localised community support

White's (2003) strategy is an example of implementing a proactive approach grounded in a research-based understanding of local vandalism culture. This can be compared to reactive approaches commonly implemented by rail authorities where "a technical measure is implemented quickly to address an outbreak of graffiti, such as building higher fences or installing better lighting in holding yards" (Thompson et al., 2012, p. 1288). As outlined by Thompson et al. (2012), the success of White's strategy in Bankstown can be contributed to its future-focused approach with enlisted community support. It is important to note that this strategy is in reference to graffiti only, other forms of vandalism common in the rail environment such as seat slashing and window etching have not been incorporated.

Petterson and Stafford (2004) maintain that a framework centred around "crime prevention" can be a useful strategy when developing holistic approaches to deterring vandalism. This framework includes:

- **Law enforcement** – measures that enforce the law against perpetrators through the criminal justice system
- **Situational crime prevention** – measures that are designed to reduce opportunities, reduce rewards, or increase the chances of catching perpetrators
- **Criminality prevention** – measures that are designed to reduce the risk of potential perpetrators from becoming involved in crime or anti-social behaviour

Example initiatives incorporating this framework include those by the London Underground Graffiti Unit which was first established in 1982 (temporarily disbanded in 1982 and re-established in 1997). Pieces of graffiti are recorded into a database with hotspots, trends and offenders identified. The police are then able to target their operations towards these identified areas and perpetrators. Upon arrest, all evidence for known offences is presented to the court. Searches through the offender's home and computer records are also carried out to strengthen the chance and severity of conviction (Petterson & Stafford 2004). This approach demonstrates how intelligent technology can assist security measures to increase the likelihood of locating and apprehending offenders.

## 6. Discussion

Numerous studies have been conducted to examine the causes and effects of vandalism in the rail environment. Effective deterrent programs largely incorporate elements from a variety of the six areas discussed, with multi-faceted approaches yielding the greatest levels of

success. In relation to the holistic approaches listed above, research into the motivations and culture of vandalism laid the base for developing effective, locality specific solutions. When attempting to research the behaviour and culture of different subsets of vandals, a qualitative approach is often recommended by researchers. Such research will also help address unwanted “problem displacement” effects where the reduction of vandalism in a certain area may result in negative reactions in alternative areas. Understanding a vandal’s values, motivations and cultural beliefs presents a core challenge for researchers, as ascertaining this information is difficult to gain from closed social groups. Ethnographic approaches have been recommended as a potential research method by Thompson et al. (2012) but the legality and safety concerns present further challenges. Although interviews can be conducted if given the opportunity, the validity of these results are cause for concern due to the vandals’ inherent mistrust and dislike of authority figures and social convention. Conducting virtual ethnographies has been recommended as a potential solution to these issues as it is able to overcome participant concerns such as anonymity and researcher safety (Thompson et al. 2012). The recording of data in relation to the reduction of vandalism minimisation strategies was also difficult to ascertain. The means for measuring the effectiveness of certain methods varied greatly, often depending on the individual or group collating the data and should, therefore, be considered.

Beyond the necessary understanding of the culture and motivations of vandalism, a number of strategic lessons can be learned when reviewing the available literature. Such lessons form the contribution of this paper and, where possible, should be incorporated into future abatement programs. These lessons include:

1. Tailor investments towards long-term solutions rather than quick fixes
  2. Embed rapid removal programs into a holistic framework for more effective results
  3. Incorporate innovative materiality and design decisions to reduce potential to offend
  4. Implement intelligent technology systems to assist with targeted responses
  5. Include partnership approaches involving the transport authority and outside organisations to reduce problem displacement issues
  6. Engage young people’s creativity (law enforcement or situational crime prevention measures are not sufficient)
  7. Effective and consistent measures need to be enforced by the criminal justice system
- Future research must investigate how multi-faceted approaches can be utilised to develop more successful prevention, intervention and reactive strategies.

## **7. Conclusion**

This literature review has analysed prominent international and local cases in relation to reducing vandalism, with a focus on rail environments. The different subsets of vandalism have been dissected with its accompanying motivations and objectives explored through the lens of its cultural environment. The various deterrent methods were reviewed under six headings which included maintenance, materials and design, technology, authority and law, community involvement and holistic approaches. Approaches embedded in a holistic framework, partnered with a core understanding of underlying motivations and culture, yielded the most effective results in reducing vandalism. Such approaches need to be tailored towards long-term results rather than quick fixes in order to be financially viable solutions. Effectively reducing vandalism involves prevention and immediate, pro-active responses. These strategies should also consider social aspects of the behaviour. Enlisting wider community support helps to address the issue from multiple angles, while engaging young people and repeat offenders can break the cycle of vandal behaviour. The introduction of innovative materiality and design choices, coupled with smart technology systems, can also greatly assist in developing targeted responses. Ultimately, these minimisation strategies need to be supported by an effective and fair criminal justice system.

When attempting to translate the key findings from this review into future mitigation strategies, it is essential to identify the key objectives. Such objectives may include reducing maintenance and security costs, increasing the public's perception of safety as well as adhering to contractual obligations. Ultimately, asset protection is an area that will address issues surrounding expenditure, perception and safety. Future research should, therefore, identify rail assets most at risk and then devise asset protection solutions. Research must also be undertaken to establish the forms of vandalism causing the greatest operational impact. As different types of vandalism result from different motivations, it is essential to identify and target specific types of this behaviour. Embedding this research in a core understanding of vandalism culture will also greatly assist in successfully reducing the number of incidents.

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