

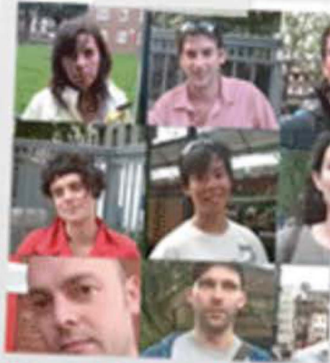
This is the Bikeoff Design Resource

A summary of 2 years' research about bike theft and how to design against it.

About Bike Theft



One bike is stolen every minute in the UK.
Find out how



It could be you!
Bike theft victims tell their stories



Years of research and over 200 references.
The Bikeoff bibliography

Design Brief



RSA Brief
The challenge and submission details

Design Responses



Over 40 case studies of bike parking facilities worldwide



New ideas for bike locks



Europe's Public Bike Hire Schemes reviewed



Bike parking Furniture Innovation



25+ examples of cycling advocacy schemes

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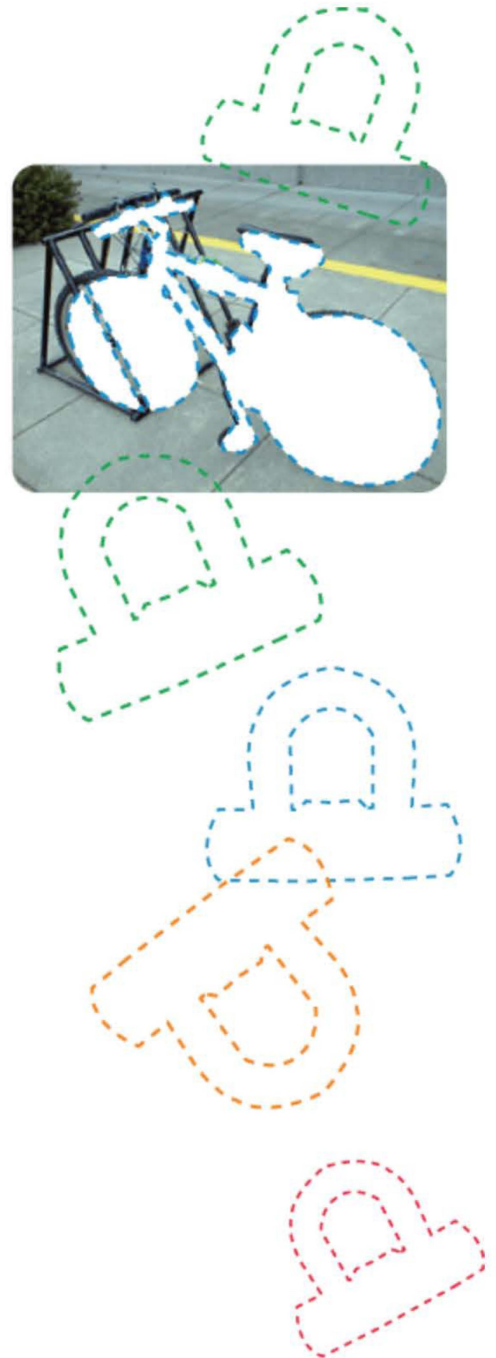
In the UK, a bicycle is stolen every minute and less than 5% of those are returned to their owners. The latest International Crime Victim Survey estimates that cyclists are more likely to have their bikes stolen than motorcyclists their motorcycle or car owners their car (ICVS, 2007). It's not surprising then that cycle theft is found to be the single greatest deterrent to cycle use after fears concerning road safety.

There are two kinds of theft related to bicycles:

1. Theft of bicycles describes the theft of the cycle frame and its components
2. Theft from bicycles describes theft of components and accessories such as lights, seats and wheels. As bicycles are of composite construction they are particularly vulnerable to [component](#) theft, especially 'quick release' features

Despite the high incidence of cycle theft, many go unreported to the police. This makes understanding the problem of bicycle theft difficult as police data typically under-represents the problem. This is illustrated by data from the International Crime Victim Survey (2000), which shows that across the 17 countries surveyed, on average only 56% of bicycle thefts were reported to the police. Similarly, in England and Wales, a comparison of police recorded statistics with estimates from the British Crime Survey (BCS) suggests a four-fold difference in the extent of the problem.

Interviews with bicycle theft victims indicate that under-reporting is largely due to them believing that the police are not interested in tackling bicycle theft nor can they do anything about it, both in terms of catching the bike thief and returning the stolen bicycle. A further reason for an under-representation of the problem is that many police departments record bicycle theft in different ways, for example, a bicycle theft may be recorded as a burglary from a residential property. However inadvertent, these issues relating to reporting and recording may serve to conceal the full scope of the problem.



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Why Prevent Bike Theft

Cyclists are more likely to have their bike stolen than car or motorbike owners.

Cycle theft, and fear of it, is found to discourage and impede cycle usage (Davies et al. 1998). Interviews with victims of cycle theft also indicate that few replace their bicycles once stolen (Mercat and Heran, 2003). UK research shows that, 17% of cyclist experience bicycle theft. Of these, 24% stop cycling and 66% cycle less often (DTR/TRL 1996)

Cycle theft is the second detractor from cycle use after fears about road safety.

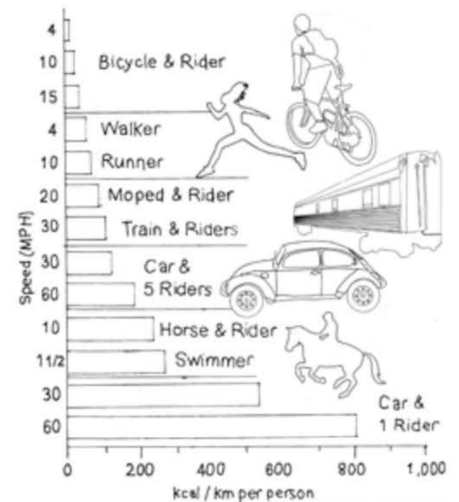
Cycling offers numerous health and environmental benefits. Which is why it is **increasing**.

Encouraging the switch to sustainable transport alternatives - such as walking and cycling - is therefore a much sought-after policy target.

Ultimately we need to encourage cycle use because of the benefits it brings to our planet. These benefits include:

- Health benefits
- Energy benefits
- Benefits of bikes to Road Users and Motorists

Neglecting the risks associated with increased cycle usage may therefore jeopardize achieving commendable policy aims. To maintain the growth in cycle use and thus realise the benefits that cycling offers, we must therefore reduce the risk and incidence of cycle theft and increase the safety of cyclists.



On average bikes require only 35 calories per passenger mile.



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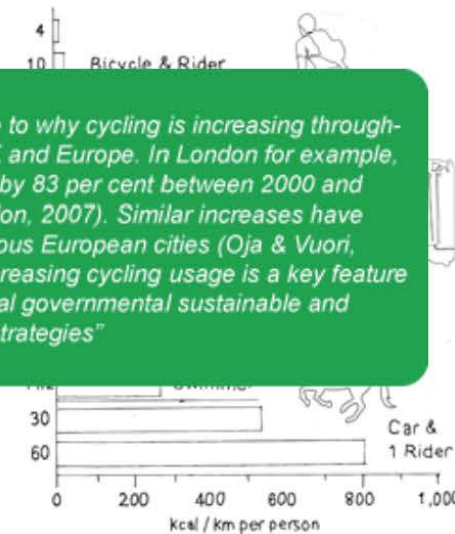
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Neglecting the risks associated with increased cycle usage may therefore jeopardize achieving commendable policy aims. To maintain the growth in cycle use and thus realise the benefits that cycling offers, we must therefore reduce the risk and incidence of cycle theft and increase the safety of cyclists.

"Such benefits contribute to why cycling is increasing throughout many parts of the UK and Europe. In London for example, cycle use has increased by 83 per cent between 2000 and 2007 (Transport for London, 2007). Similar increases have been observed in numerous European cities (Oja & Vuori, 2000). Consequently, increasing cycling usage is a key feature of many national and local governmental sustainable and inclusive transportation strategies"



www.exploratorium.edu



On average bikes require only 35 calories per passenger mile.

and 66% cycle less often (DTK/TRL 1996)

Cycle theft
after fears a

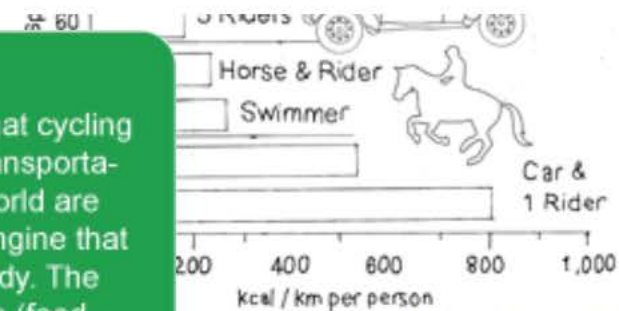
Cycling offer
benefits. Wh

Encouraging
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In December 1972, *Scientific American* calculated that cycling is more energy efficient than any other method of transportation, including walking. One billion bicycles in the world are testament to their effectiveness. What's more, the engine that runs this efficient mode of transport is the human body. The fuel for this engine is (at least in principle) renewable (food and water) and better still emissions do not damage the environment. On this point, Edwards (2008) recently described how switches to sustainable transport may reduce the progressively-increasing price for oil, as motorized transportation demand is lessened.

- Health benefits
- Energy benefits
- Benefits of bikes to Road Users and Motorists



www.exploratorium.edu



Cycling offers numerous health and environmental benefits. Which is why it is increasing.

Encouraging the switch to sustainable alternatives - such as walking and cycling - is a much sought-after policy target.

Ultimately we need to encourage cycling as the benefits it brings to our planet. These benefits include:

- Health benefits
- Energy benefits
- Benefits of bikes to Road Users and Motorists

Neglecting the risks associated with increased cycling

A comparison of the energy cost of various forms of transportation shows that the bicycle is most energy-efficient. It takes less energy to cycle one mile than it takes to walk a mile. In fact, riding a bicycle can be up to 5 times more energy efficient than walking. If we compare the amount of calories burned in cycling to the number of calories a car burns, the difference is astounding. One hundred calories can power a cyclist for three miles, but it would only power a car 85 metres.



On average bikes require

Cycle theft is the second detractor from cycle use after fears about road safety.

Cycling offers numerous health and environmental benefits. Which is why it is **increasing**.

Encouraging the switch to sustainable transport alternatives - such as walking and cycling - is a much sought-after policy target.

Ultimately we need to encourage cycle use to bring the benefits to our planet. These benefits include:

- Health benefits
- Energy benefits
- Benefits of bikes to Road Users and Motorists

Neglecting the risks associated with increased cycle



A recent international review of schemes to encourage walking and cycling found strong evidence indicating that as the number of cyclists and walkers increased, the frequency of collisions between those groups and motorists actually decreased. The authors concluded that an effective means of improving the safety of cyclists and walkers is therefore to increase the numbers of people walking and cycling. Despite this, little attention has been paid to the prevention of bicycle theft, that actually constrains the number of cyclists on the road and consequently reduces safety on the road.



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Bikes Are A 'Hot' Product

The term 'hot product' is widely used to describe those items most likely to be stolen by thieves. The British Home Office uses the related acronym C.R.A.V.E.D, coined by the criminologist Ron Clarke (1999), to describe the features that elevate an item's risk of theft, as follows:

Concealable, Removable, Available,
Valuable, Enjoyable and Disposable

Like typically stolen items such as cash and mobile phones, bikes too are a good example of a 'hot product'. Their monetary value and ease of transport provide an attractive target for bicycle thieves. Johnson, Sidebottom and Thorpe (2009) describe how bicycles fit neatly into the CRAVED framework.



C . R . A . V . E . D . 

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Stealing a bike can look like unlocking a bike and a thief on a bike looks like anyone else on a bike, making it highly CONCEALABLE.



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Poorly locked and self-mobile means easily REMOVABLE.



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Bikes are AVAILABLE because millions of bikes are on the street or in sheds up and down the UK.



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Everyone ENJOYS cycling and 'sporty' bikes are twice as likely to be stolen.



C . R . A . V . E . D .





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Lack of effective registration and high demand for bicycles makes them easily DISPOSABLE.



C.R.A.V.E.D.





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Young men below the age of 20...their reasons are varied and include:

- Joy-riding - those who steal any type of bicycle for transportation purposes and/or enjoyment. These offenders generally abandon the stolen bicycle after use. Younger offenders (16 and under) typically fit this group ([Challinger 1986](#); [Loder and Bayly Ltd 1986](#) ; and [Sokol 1992](#)).

- Bike freaks – better known as bicycle focused offenders - those who steal specific types of bicycles and/or large numbers of bicycles to order ([Nuttall 2001](#)).

- Acquisitive kids / criminals - those who exploit easy opportunities to steal anything, including any type of bicycle, and exchange it for cash or other goods (such as drugs).

- Drug Addicts - of any age, who are opportunistic and need a fix and in UK are found to sell bikes for cash to buy drugs ([Van Kesteren and Homburg, 1995](#)).

To understand who commits bike theft and why, the following information can help inform design and police interventions.

[About Offenders](#)

[About Victims](#)

Know The Enemy : Ever wondered how those thieving little buggers nick your bike? Here's how...
Video created by Bold Creative

Also check out...
[Bike Thief \(Neistat Brothers\)](#)

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Unfortunately, low clearance rates for this type of crime make it difficult to gather detailed information on active bicycle thieves. Hence Bikeoff have started a series of interviews with prolific offenders in order to investigate the links between bike theft and drug related crime. This work is on-going, initially focusing on male offenders.

Currently, available evidence does indicate however that the majority of offenders tend to be male and below the age of 20 (Birmingham Community Safety Partnership, UK, 2007).

Moreover, an examination of the frequency with which bicycles are abandoned can provide useful insights into offenders' motivations. For example, in a study of bicycle theft in Ellensburg (Washington) 25% of stolen bicycles were recovered by the police, suggesting that around a quarter of bicycles were stolen by offenders who might be described as joy-riders (Roe and Olivero, 1993).

In a Dayton (Ohio) police initiative the problem was reversed with approximately 80% of stolen bicycles being recovered, suggesting that many more offences were committed for the purposes of transportation or enjoyment than for financial gain (Dayton Police Department 1999).

Know The Enemy : Ever wondered how those thieving little buggers knick your bike? Here's how...
Video created by Bold Creative

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- Bike freaks – better known as bicycle focused offenders - those who steal specific types of bicycles and/or large numbers of bicycles to order ([Nuttall 2000](#)).

It is important to be aware that victims and offenders may not always represent distinct groups. For example, studies suggest that victims of bicycle theft sometimes either steal bicycles themselves in order to make up for their loss, or knowingly purchase bicycles which are themselves stolen (van Dijk, 1994; Weijers, 1995). This type of pattern illustrates a concept referred to as a crime multiplier, whereby one offence leads to the commission of several others. These offences may include the fencing or receiving of stolen goods. Thus, a single incident of bicycle theft does not necessarily equate to one offence but may lead to a series of related crimes.

Know The Enemy : Ever wondered how those thieving little buggers knick your bike? Here's how...
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Bicycles can be stolen in various ways. The phrase 'perpetrator technique' is primarily used by law enforcement officers and crime prevention professionals to describe the methods used by offenders to commit crime, in this instance to steal bicycles. The perpetrator technique used is often linked to the locking practice of the cyclist (i.e. the type of lock used and the way it is applied), for example where the bike is unlocked or poorly secured then little skill is required to remove it.

Some common perpetrator techniques used to steal locked bikes are described here. These can also be viewed in the animation [Know the Enemy \(2006\)](#) which suggests that in order to win the battle against bike thieves, it is important to understand the tools and techniques for bicycle theft commission, which can usefully inform preventive action and the Design Against Crime process.



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Bike theft is not random. Like most crime types, bicycle theft is found to concentrate on certain people and in certain places. Common locations where bicycle thefts occur include in or around the home (Loder and Bayly Ltd. 1986; Mercat and Heran, 2003; Nicholas et al. 2005; Zhang, Messner, and Liu, 2007) and at university campuses and railway stations (Replogle, 1984; Challinger, 1986).

Recent increases in the popularity of cycling as a means of transport are a likely explanation of large numbers of bicycles being reported stolen from on-street locations. In this regard, results from the British Crime Survey (BCS 2004/05) found that 18% of bike thefts in England and Wales occurred from on-street locations. Similarly in France, interviews with cycle theft victims found that the majority of cycles are stolen from on-street locations (Mercat & Heran, 2003). Certain places were victimized more often than others.

Bike theft 'hot spots' in terms of the number of thefts per 1000 resident population:

In London

Outside London

Certain people are also victimized more than others. The U.S. Department of Justice (2000) found that those aged 12-17 were 4.2 times more likely than adults to have their bicycles stolen. Students in university towns such as Oxford and Cambridge - as shown above - are also common victims, with peak bike theft levels typically coinciding with the start of university term (Hird & Ruparel, 2007). Men are generally found to use bikes five times as much as women, and in terms of the population at risk, it is possible that males are more likely to be victimised than females.

Many victims also have their bike stolen more than once. For example, a victimization survey in Holland found that across a range of crimes, victimization rates were highest for bicycle theft and prior victimization was associated with the increased likelihood of further incidents of bicycle theft (Wittebrood and Nieuwbeerta, 2000). In Melbourne, Australia, it was likewise found that just 30 percent of bike theft victims accounted for 60 percent of the bicycle thefts reported (Johnson et al. 2008).

The risk of bike theft is also found to spread in time and space and thus possess a contagion-like quality. For example, just like patterns observed for burglary and vehicle crime, further incidents of bike theft were found by Johnson, Sidebottom and Thorpe (2008) to be more likely to occur close by a previous bike theft incident and up to a distance of about 450 yards for a period of around three to five weeks.

"It could be you! Bike theft victims tell their stories"

Also Check out...

[Stop Nicking My Bike \(Dominic Waugh/ BRITDOC\)](#)

locations. Similarly in France, interviews with cycle theft victims found that the majority of cycles are stolen from on-street locations ([Mercat & Heran, 2003](#)). Certain places were victimised more than others.

Bike theft 'hot spots' in terms of rate per 1000 resident population

In London

Outside London

Certain people are also victimised. The U.S. Department of Justice found that those aged 12-17 were 4.2 times more likely than adults to have their bicycles stolen. University towns such as Oxford and Cambridge shown above - are also common hotspots. Bike theft levels typically coinciding with university term ([Hird & Ruparel, 2007](#)). Men are generally found to use bikes five times as much as women, and in terms of the population at risk, it is possible that males are more likely to be victimised

"It could be you! Bike theft victims tell their stories"

Also Check out...

[Stop Nicking My Bike \(Dominic Waugh/ BRITDOC\)](#)

1. City of London – 18.0(!) in summertime
2. Islington – 3.7
3. Camden – 2.4
4. City of Westminster – 2.3
5. Tower Hamlets – 2.1
6. Hammersmith and Fulham – 2.0
7. Kingston-Upon-Thames – 1.8
8. Hackney – 1.8
9. Southwark – 1.8
10. Wandsworth – 1.7

Note that City of London level is artificially high because there are few residents as opposed to daytime workers and tourists (BCS).

Bike theft 'hot spots' in terms of the number of thefts per 1000 resident population:

In London

Outside London

Certain people are also victimized more often than others. The U.S. Department of Justice (2000) found that those aged 12-17 were 4.2 times more likely than adults to have their bicycles stolen. Studies have also shown that university towns such as Oxford and Cambridge, shown above - are also common victimization hotspots. Bike theft levels typically coinciding with the start of the university term (Hird & Ruparel, 2007). Research has generally found to use bikes five times as much as women, and in terms of the population at risk, it is possible that males are more likely to be victimised than females.

1. Cambridge – 6.9
2. Oxford – 4.2
3. Gosport – 2.4
4. Southampton – 2.3
5. York – 2.1
6. Norwich – 2.0
7. Reading – 2.0
8. Lincoln – 1.9
9. Cheltenham – 1.9
10. Bristol – 1.9

(BCS)

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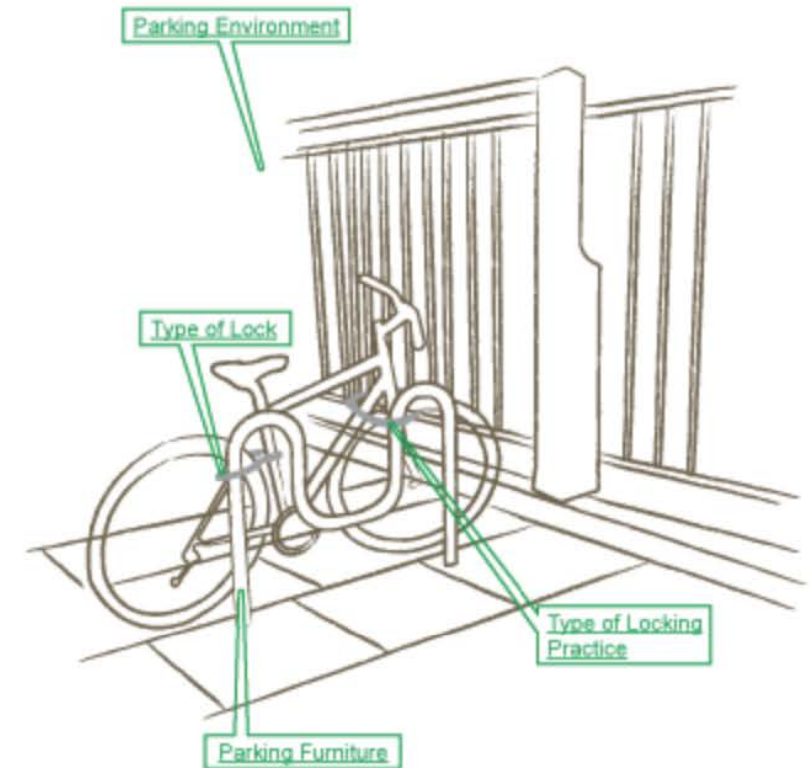
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Contributing Factors

The majority of bicycles are stolen when left unattended, 'parked' or stored inside or outside the home. In cities such as London and Brighton & Hove the majority of thefts occur away from the home. In other areas of the UK, the highest incidence of bike theft is from houses, sheds and garages. This may be linked to the type of cycle use associated with a geographical location - cities with high cycle commuter numbers experiencing more on street thefts and those with higher leisure cycle use experiencing domestic cycle thefts.

These factors are indicated on the illustration shown to your right. Click on any of the links to find out more.



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Response Strategies

There are various types of existing responses to the problem of bicycle theft. Here are 8 common strategic responses with a brief descriptions of what's involved:

1. Improving the use of effective bicycle locks and locking practices
2. Reducing flyparking
3. Improving parking furniture
4. Increasing guardianship
5. Educating the public about the problem and effective prevention
6. Improving traditional bicycle registration schemes
7. Implementing an electronic tagging scheme
8. Setting traps to catch bicycle thieves

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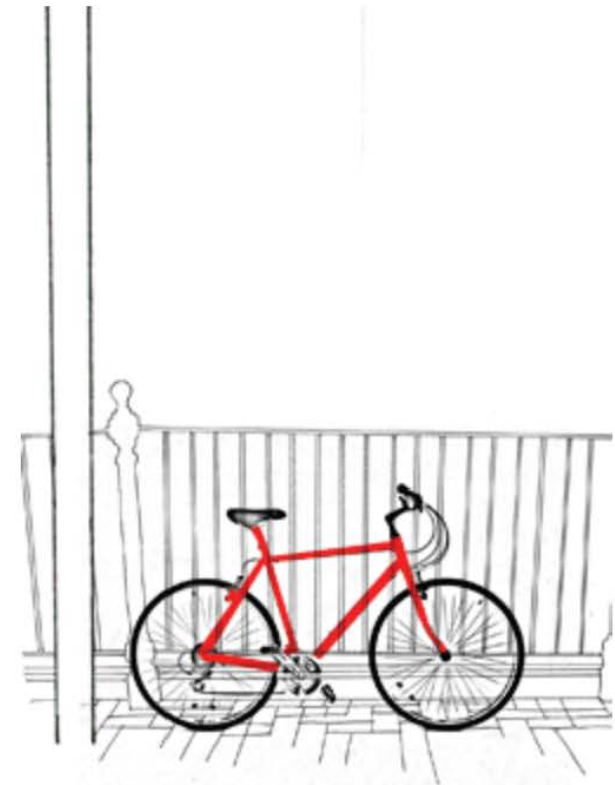
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1. Improving the use of effective bicycle locks and locking practices

Research consistently shows that many bicycles reported stolen are locked inadequately (Weijers, 1995; Mercat & Heran, 2003; Roe & Olivero, 1993). Westminster Council in London have introduced discount schemes with shops, and police officers have identified poorly parked bikes and encouraged the cyclists that own them to buy better locks and understand what type of locks are out there - see Locks Section for further discussion. Bikeoff, in particular, has campaigned and communicated with cyclists about how best to improve locking practice using stickers and leaflets about common theft techniques.

The effect of some of these communication strategies has been studied by Sidebottom, Thorpe and Johnson (in press) who analysed how a targeted communication strategy in the form of a sticker which illustrated how to lock a bicycle securely - was found to significantly improve the locking practice of cyclists compared with those locking their bikes to furniture on which the sticker was not present. This finding was consistent across two different experimental settings and was taken as a proxy measure for a reduction in the opportunities for bicycle theft. Similarly in Leuven, Belgium (Van Limbergen et al. 1996) found reductions in bike theft after implementing a targeted publicity campaign called 'lock it or lose it', in which cards were attached to poorly-locked bikes informing cyclists how to lock them more securely (although some litter issues have been reported linked to cards attached to bikes).



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2. Reducing flyparking

Flyparking refers to bicycles being secured to furniture not designed for that purpose, and is often an indication of insufficient provision of bicycle parking furniture in the vicinity. [Gamman, Thorpe and Willcocks \(2004\)](#) argue that flyparked bikes are typically more vulnerable to theft as the furniture they are locked to tends not to provide optimal locking points for securing both wheels and the frame of the bike. Local police data for Camden, London supports this. Of all the bicycles reported stolen in Camden between 2004 and 2005, 72 percent were flyparked ([London Metropolitan Police, 2006](#)). Consequently, bike theft schemes have sought to reduce flyparking and thus reduce risk of bike theft.

At the University of Minnesota for example, flyparking on campus was identified as a major problem. In response the University of Minnesota Police Department, working alongside student monitors, initiated a scheme in which flyparked bicycles were issued with a warning in the form of a sticker attached to the bike. Thereafter, any bicycles found to be flyparked a second time were fined \$34. Finally, repeat 'flyparkers' were 'booted' - locked with a bright orange U-lock - and instructed to contact a student monitor to pay a fine to have the lock removed. Results indicated that bicycle theft fell from around 350 incidents per year before intervention to less than 150 per year for the two year period afterwards ([Cook, 2006](#)).

Similar flyparking management schemes have proven effective in [Amsterdam](#). Here, flyparked bikes were removed, registered by the municipality and then returned to their owners for a fee of €10.





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3. Improving parking furniture

Furniture to which bicycles are secured doesn't always promote secure locking. Locking practice and poorly designed furniture may inadvertently escalate the risks of bike theft. For example, a typical way that cyclists secure their bicycles to U-shape (n) Sheffield stands makes bikes vulnerable to rotational [leverage](#). [Johnson, Sidebottom and Thorpe \(2008\)](#) describe a number of prototype bicycle parking stands designed to improve the security of cyclists locking practices.

In the case of the M-stand (*right*) the design removes the opportunity for cyclists to park on the cross bar and thus improves locking practice, such as securing both the wheels and frame to stand. Evaluation assessing the impact of M-stands found significant improvements in cyclists locking practice compared with bikes locked to Sheffield stands, indicating that changes in the parking furniture positively influenced cyclists' behaviour in a way that would increase the effort needed to steal bikes.





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4. Increasing guardianship

Can 'eyes on the street' serve to deter criminals and reduce crime? Natural surveillance may increase the visibility of bicycle theft, but bystander intervention is by no means assured. Similarly, CCTV does not guarantee the security of bikes nor will it necessarily act as a suitable deterrent. [Thorpe](#) (2007) for example found that on a bicycle parking site in central London covered by three separate CCTV cameras, on average one bicycle was stolen per week. Furthermore, over a six month interval no bike thieves were apprehended using this footage.

To increase guardianship and reduce bicycle theft, many [schemes](#) have been developed. Some deploy informed, empowered and motivated guardians such as attendants or security guards, who have a claim of ownership to the facility. For example, bike-rental schemes such as those typical in Amsterdam have cycle repair shops strategically located in bike parks. Throughout Europe bicycle repair shops are often situated in parking locations that thereby benefit from increased guardianship. In Sint-Niklass (Belgium) a supervised bicycle shed was implemented at the train station which required cyclists to subscribe to use the facility. A report by [Van Limbergen](#) and colleagues (1996) suggested that over a one-year period following inauguration of this scheme no cycles were reported stolen from the facility. There is of course an ongoing financial cost associated with staffing such schemes. Some Dutch authorities use subsidized labour, and give attendant jobs to prisoners (reformed drug addicts) who are returning to normal life and need a first job.





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5. Educating the public about the problem and effective prevention

There are many ways of communicating with the public about bike theft without raising fear of crime.

The British Transport Police ([COPS guide](#)), for example, have recently been giving away RFID tags at train stations to persuade the public to register their bikes.

The Metropolitan police ([COPS guide](#)) circulate leaflets about improving locking practice, and some organizations and councils take even more creative approaches to educate the public. For example, Bikeoff utilised films about bike theft from the [Bike Film Festival](#) (which are shown in 16 countries) to communicate with a crime prevention audience about locking securely. Islington Council repeated this film show to educate both student and police groups about what it's like out there. Bikeoff are currently researching best ways of including address to locking practice in cycle proficiency training, and promoting this aim.



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6. Improving traditional bicycle registration schemes

A principle reason police fail to reunite recovered bicycles to their rightful owners (Johnson et al. 2008) is linked to the proof of ownership problem: the majority of cyclists cannot provide proof of ownership for the retrieved cycle. As a result, bicycle registration schemes are a popular mitigating response to bike theft. Schemes such as **Immobalise** can help reduce cycle theft because : 1) the registration of cycles makes it easier to identify stolen bikes and determine the rightful owner of a bicycle, and 2) it may also serve to deter bike thieves by making registered bikes harder to sell on.

In Portsmouth, U.K. a police initiative aimed to reduce, among other things, theft of bicycles at a local school (Hampshire Constabulary, 2006). Working alongside the local media and council, a bicycle marking scheme was implemented at the school and in the surrounding area in the form of road shows. Bicycles were marked using ultra violet pens or acid etching and a 24:7 telephone database was launched to enable cyclists to log details about themselves and their bikes. Assessment indicated that the number of reported cycle thefts at the school fell by 39% in the year following the scheme.

In Dayton (Ohio USA) 5000 cycles were registered in 1998 and around twice as many (38%) recovered bicycles were returned to their owners. Similarly in Eugene (Oregon), 14% of stolen bikes that had been marked were subsequently recovered compared to 5% of those stolen unmarked.

Such studies suggest that registration schemes may particularly aid the task of returning recovered bicycles to their rightful owners. This can be useful for a number of reasons: it can reduce the number of recovered bikes that must be stored by the police; it can facilitate efforts to return recovered cycles; it may reduce the cost of crime to the victims as they will not have to replace recovered bicycles (unless they are damaged); and it can be a good public relations exercise in that the police are seen as actively doing something about the problem.

A potential shortcoming however with cycle registration schemes is that they are unlikely to prevent theft from cycles, as only the bicycle's frame is typically marked. In addition, bicycle theft will be prevented only if offenders are aware of the scheme, perhaps linked to a visual deterrent on the bike. But offenders usually in a hurry to steal bikes, may fail to notice bike markings that indicate the owner has registered it. The overt marking of registered bicycles is therefore important if the aim of the intervention is to prevent cycle theft in addition to aiding the recovery and return of stolen cycles.



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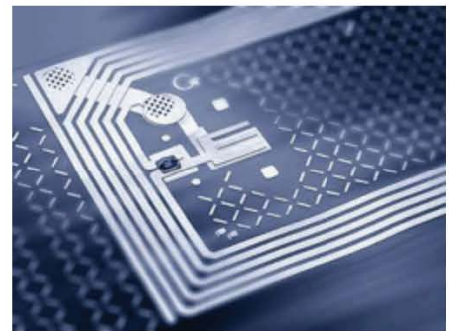
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7. Implementing an electronic tagging scheme

Radio Frequency Identification Devices (RFID), which are widely used in the distribution and retail sector for tracing stolen goods and deterring thieves, are also used to protect bikes. At Ohio State University, a scheme called Bug-a-Bike™ provided cyclists with the opportunity to have a small RFID tag installed in the seat post of their bicycle, or fixed to the frame (Kleberg, 2002).



Striking labels were also fixed to the 'bugged' bicycles to warn would-be offenders that the bike had been tagged. Participating cyclists were required to submit their details to a web-based registration system linked to their unique RFID tag, thus enabling each bike to be registered to its owner and if stolen, for the police to be able to easily identify the bicycle using an RFID reader.

Though no assessment has been made on the impact on bicycle theft to date, the scheme has been successful in terms of registration uptake, increased numbers of recovered bicycles been returned to their owners, and importantly, popularity with students.

A similar RFID scheme was implemented in Southend (UK). Here, police officers provided bicycle dealers in the local area with RFID readers to check if bicycles brought to them for sale or repair had been reported as stolen.

Again, although a systematic assessment of the impact on bicycle theft is yet to be conducted, both examples illustrate the potential for using new technology to enhance existing crime reduction strategies. It should be noted however that potential problems with such interventions are that they rely on a reasonable level of take-up to be effective and that they are in any case unlikely to impact upon the sale of stolen bicycle parts.



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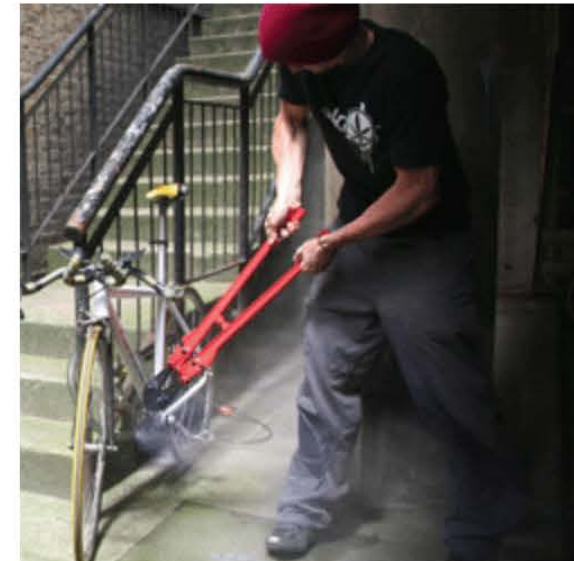
8. Setting traps to catch bicycle thieves

Using bikes as bait by fitting them with a covert tracking system and leaving them (insecurely) locked in a prominent location is one way of trying to track thieves. If the bicycle is moved, local police officers are alerted and can track the stolen bicycle with the aim of apprehending the offender.

This type of initiative can also usefully assist in gathering information on the potential locations of stolen goods markets.

Though anecdotal evidence suggests such schemes are effective (see [Johnson et al. 2008](#)), implementation does require consultation with government agencies, as officials in Belgium for example were particularly concerned with supporting what they saw as an incitement to theft ([van Limbergen et al, 1996](#)).

Finally, from the perspective of convicting a bike thief it may be necessary to capture them on CCTV to show that they actually stole the bicycle rather than simply finding it abandoned, in which case the location of the bicycle has to be in clear view of operational CCTV cameras or reliable witnesses.





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Underlying the thinking and experience within Design Against Crime are a range of generic preventive techniques. Here, they have been applied and adapted to bike theft. You can read more about these techniques at popcenter.org and an alternative but related approach using the Conjunction of Criminal Opportunity framework at www.designagainstcrime.com.



Spoiling



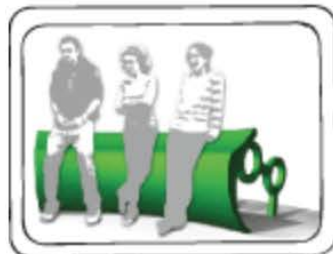
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Target Softening



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Spoiling, or denial of benefits from criminal activity, involves making the targets of theft valueless to thieves, robbers and denying others such as fences or end-buyers of stolen property to deny any profit from stealing.

The designers Adam Thorpe and Joe Hunter at Vexed Design (and London's Central Saint Martins College of Art and Design) and Jens Martin Skibsted of Biomega put their creative minds together to outwit the most savvy of folding bike thieves.

The 'Puma bike' Anti-Theft Folding Bike (2004) is one example of how designers are attempting to reduce bike theft.

The Down Tube is replaced with a steel cable that locks into a housing mounted at the junction of the top tube and head tube. This wire is a structural part of the frame stopping the bike from 'splaying' apart when weight is applied from above in use. To securely park the bike the top tube is released to fold the frame so that the front wheel sits alongside the back wheel. The cable is then released and can tether both wheels and the frame to parking furniture before locking back into the frame.

If the cable is cut to remove the bike then the remainder of the bike's frame is incomplete and structurally unsound, significantly reducing its re-sale or re-use value.

An additional benefit is the reduced number of conventional locks that the cyclist may have to carry.



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Target Hardening



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Target hardening involves increasing the physical or electronic resistance of individual objects or spaces to the force of criminal attack.

The replacement of the quick release or standard bolt fittings that fix the wheels of a bike to the frame with secure skewers makes it harder for would-be thieves to remove (and steal) the wheels of your bicycle. (See [components](#) section of design resource.)





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Target Softening

Target softening involves preventing theft or damage by the forceful attack of a thief, by literally deflecting and/or absorbing the force of the attack rather than resisting it.

An example of this is the 'spinning bolt' that closes the 'E-lock' design. The bolt is impervious to sawing or drilling as it rotates and thereby denies the tool any purchase.



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Concealment & Disguise

Decoy, or target concealment, involves hiding an object in some kind of container or enclosure, or behind a barrier; or alternatively, disguising it to look like something less valuable than it really is.

A concealment technique used by London's cycle couriers is that of taping the bike frame up with black electrical tape so that would-be thieves can't easily see the make and model and condition of the frame. The tape hides factory decals and makes bikes look more generic increasing the difficulty of identifying valuable makes and model of bike. An additional benefit is that the frame is protected.

An example of the decoy technique is the application of 'fake scratch' decals onto the bike frame to make it appear less desirable.



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Natural Surveillance

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Natural surveillance aims to use environmental design to ensure that the presence, and any suspicious behaviour, of offenders will be visible and interpretable to others.

Bikeoff research shows that many cyclists park their bikes in locations that enable them to see their bike from the window of the destination they have cycled to (and parked outside). Cycling advocacy groups recommend locating cycle parking as close to the destination that it serves as possible, in facilities where there are attendants. This allows for those who guard or manage the facility to also provide guardianship to the bike parking by keeping an eye on parked bikes.

Magnus Pettersen from Central Saint Martins won first prize in D&AD Awards 'Social Design' section responding to brief set by the Design Council that asked students to 'create a product, service or communication piece designed to specifically reduce crime'. The BLABR_stand acts as both bike rack and meeting point, so that people gathering by the bike stands might also keep an eye on the bikes, thus deterring thieves.





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This is traditionally associated with patrols supplied by police or private security companies who monitor bike parks or car parks where bikes are parked. It is also provided by CCTV and the staff who monitor it.

Utilising Place Managers is about extending, or creating, a role whereby someone takes responsibility for the security.





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Target Removal

Target removal takes the target away from the crime situation, beyond the offender's sight or reach – it might be as simple as making sure, even in your own home, that your bike is not easy to find or remove.

In terms of bike parking in public space, folding bikes have the advantage, in as much they fold down small enough to allow you to take them inside of most destinations you cycle to, thus removing the necessity to park on the street for long periods, where theft is more likely.



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Reducing anonymity will put unwanted attention upon the criminal, and/or enable them to be linked to the crime.

One of the features of the 'Bike cuff' ([project at the University of California Berkeley](#)) is that it will release ultraviolet ink if the lock is tampered with.

In fact, this is a secondary security feature designed to deter the offender from interfering with the Bike Cuff whose primary use, like The Club for cars, is as a theft blocker. Intended to be used with another lock, it secures the front wheel of the bike to its frame, and in the process immobilises the steering. The tight adjustable fit was inspired by handcuffs. This reduces space for insertion of lever, pry or cable cutting tools.

Similarly, Michael Lambourn's [student project](#) at [Central Saint Martins](#) is a cable lock that has cores of compressed air and liquid running through its body. If cut, the liquids spray out over the perpetrator, his tools, the bike and the scene of the crime.



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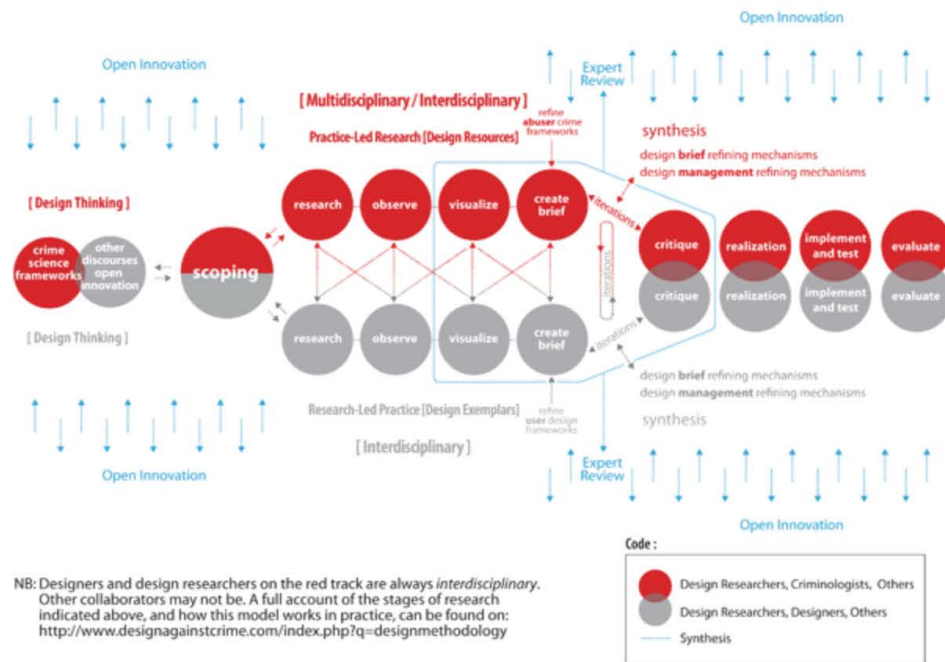
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Design Against Crime

Evolved Twin Track Model of the Iterative Design Process

[Gamman & Thorpe 2007, revised 2009 for Bikeoff]



Bicycle crime is a complex challenge to understand and successfully address.

This Design Resource in focusing on "the problem" (green section) and "design responses" (red section) has tried to make it easier to comprehend the issues quickly.

The Bikeoff Design Resource summarises key facts and debates about crime and crime prevention and locates design responses that are already out there to help designers and providers understand what has already been delivered, what works and what doesn't (how and why) enabling them to get smart quick about what to consider when creating new designs against bicycle crime.

To respond to the [RSA competition](#), users can draw on the material in the green and red sections. To help make your thinking about crime more rigorous, and to work out practice through user/abuser centred design visualisation and prototyping, we have created two further tools you might find helpful. They can be accessed via our design against crime website as follows:

[Model of design and design research and prototyping process by Lorraine Gamman and Adam Thorpe](#)

Key Readings include:

Lorraine Gamman and Adam Thorpe. *Less Is More: What Design Against Crime Can Contribute to Sustainability*. Presented at Changing The Change, Turin, Italy, July 2008.

[Crime frameworks for disciplined design thinking](#) by Paul Ekblom

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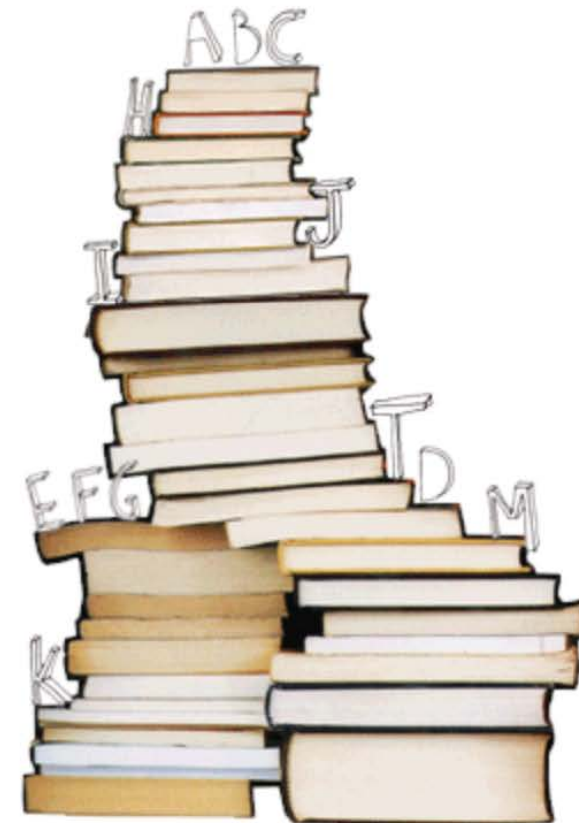
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Our bibliography contains academic references that evidence and support all the facts about bicycle use, abuse, design and crime discussed in the pages of this design resource. It can be accessed via the A-Z index of authors/titles.

We have also provided you with access to other relevant references about designs related to bicycle use in the 'Design Responses' section of this resource. These references can be found under 'Links' and 'Case Studies'.

'Links' pages give a list of web links that will help designers review what designs are already out there.

The Case Studies are written by the Bikeoff team (short: providing an overview and long: providing an in depth review). Most of these are available as downloadable PDFs. These case studies assess the strengths and weaknesses of many of the design responses featured in this resource including bikes, locks, parking furniture, parking facilities, materials and schemes.



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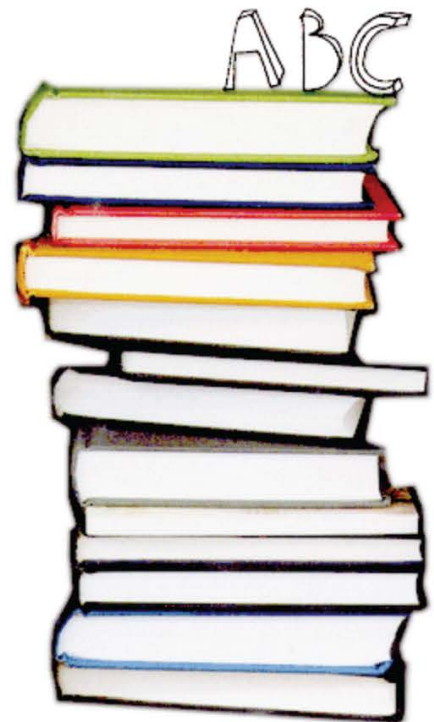
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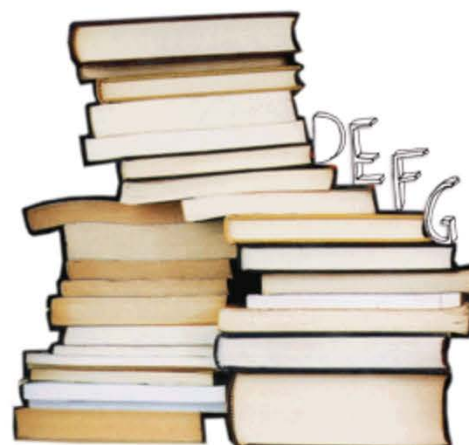
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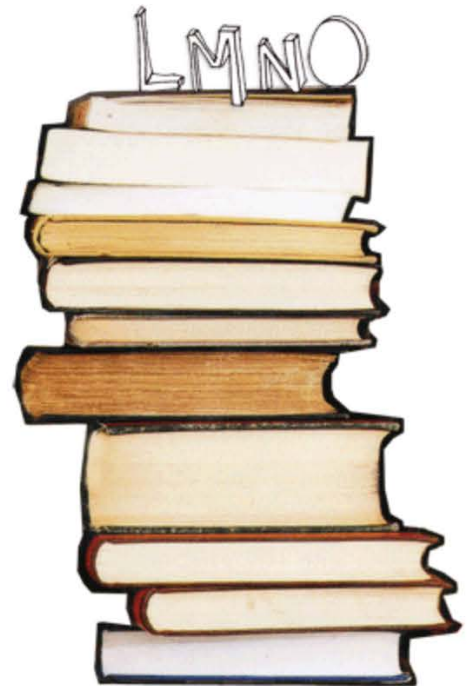
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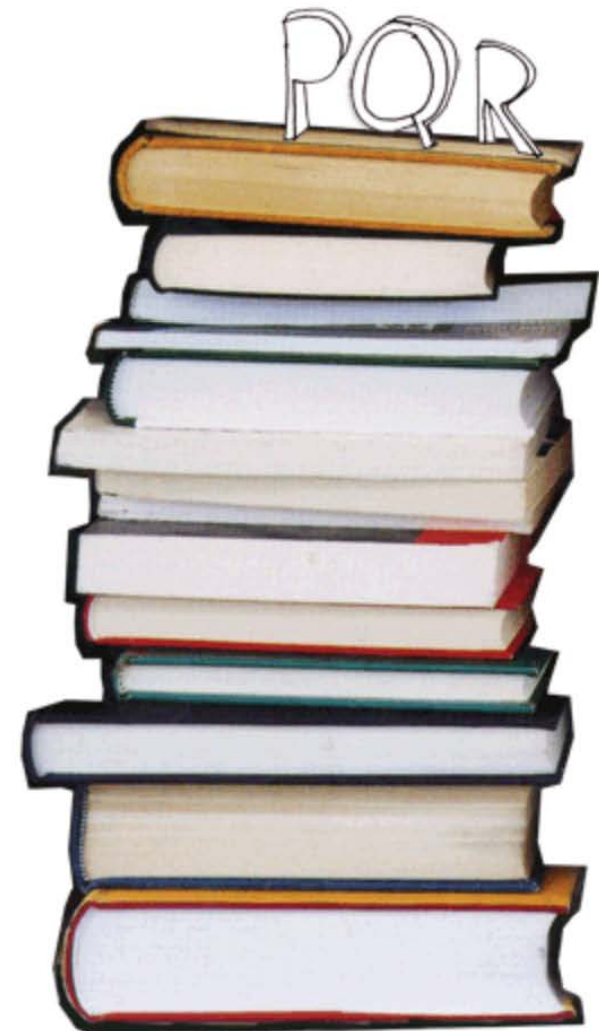
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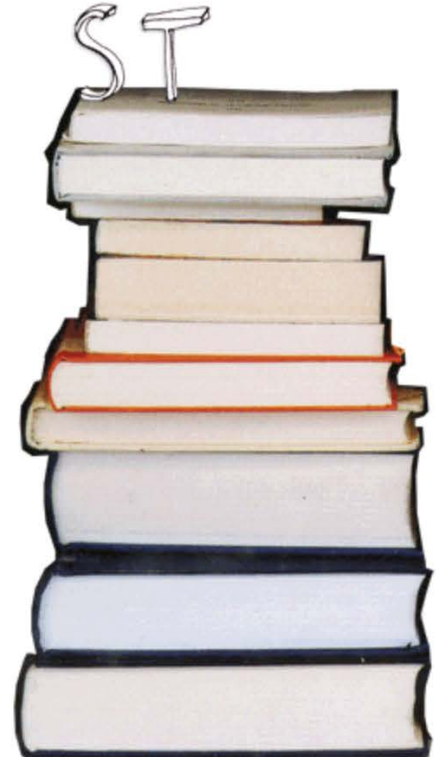
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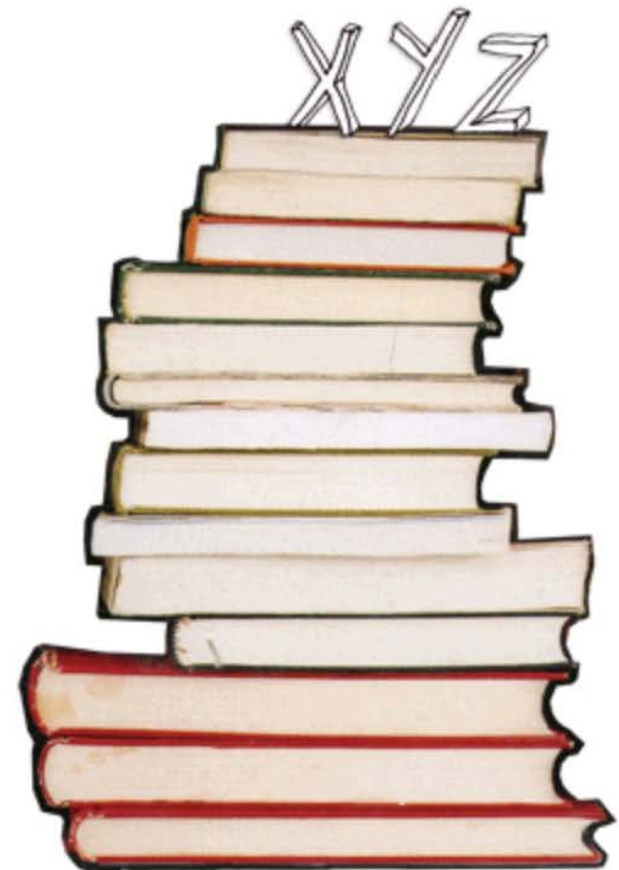
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Bikes are VALUABLE: Components 25% RRP, entire bicycles 10% RRP.



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