



# DESIGNS AGAINST BICYCLE THEFT



The Bikeoff Research Initiative at the Design Against Crime Research Centre was set up in January 2004 to explore how the design of cycling products and environments can reduce bicycle theft and promote cycle usage. We work with designers, the crime prevention community, cycling groups, local government and industry to deliver practice-led design research aimed at catalysing, and in some cases creating, cycling products, environments and services that make life easier for cyclists and harder for bicycle thieves.

[www.bikeoff.org](http://www.bikeoff.org)



# KNOW THE ENEMY

Sun Tzu 'The Art of War' suggests that to win the battle we must "know the enemy". To avoid bike theft it is important to understand the tools and techniques thieves use, and act against them. An animation of the perpetrator techniques can be viewed on [www.bikeoff.org](http://www.bikeoff.org). "Know the Enemy", a DVD of this animation, is available free (while in stock) from the Design Against Crime Research Centre via [d.d.davies@csm.arts.ac.uk](mailto:d.d.davies@csm.arts.ac.uk).

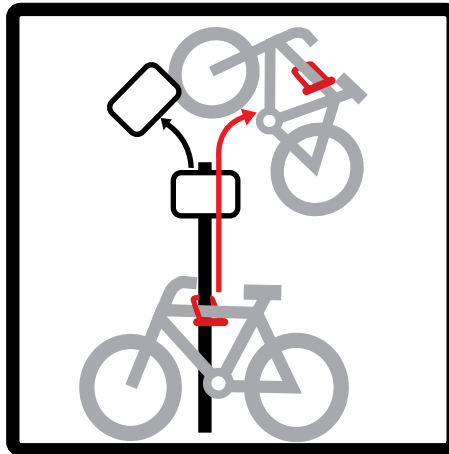
## BICYCLE THEFT PERPETRATOR TECHNIQUES

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### lifting

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Thieves lift the bike and lock over the top of the post to which the bike is secured. If it is a signpost then the thieves may remove the sign to lift the bicycle clear. They may replace the sign afterwards. Sometimes the post itself is not anchored securely and can be lifted clear of the bike and the lock.

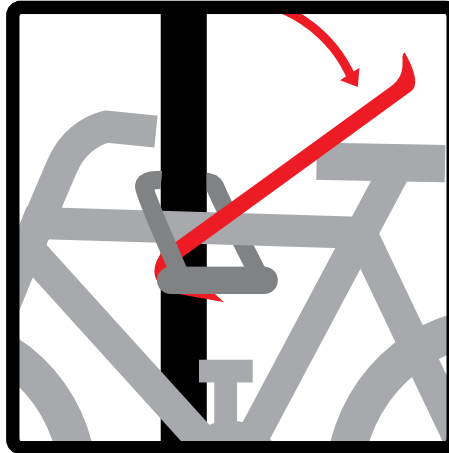


Always lock your bicycle to a 'closed structure' that is well secured to the ground. If you must lock to an 'unclosed structure' then make sure it is more than 5 metres high and well secured to the ground (thieves will stand on shoulders to pass your bike clear if the structure is low enough).

## levering

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Thieves will use the gap between the stand and the bike left by a loosely fitted lock to insert tools such as jacks or bars to lever the lock apart. Thieves will even use the bike frame itself as a lever by rotating it against the stand or other stationary object it is locked to. Either the bike or the lock will break – the thief doesn't mind which – after all, it's not their bike!

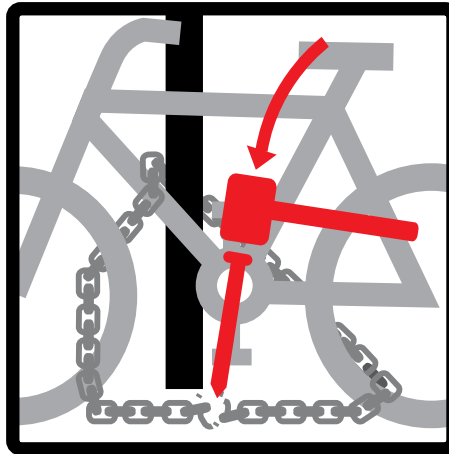


Always fit your lock so that as much of the aperture within the lock is filled by the stand and bike (and maybe helmet). This will make it harder to insert tools between the lock and the stand. **Never lock your bike by the 'top tube' (AKA 'crossbar') alone** as this will allow for the bike frame to be rotated against the lock.

## striking

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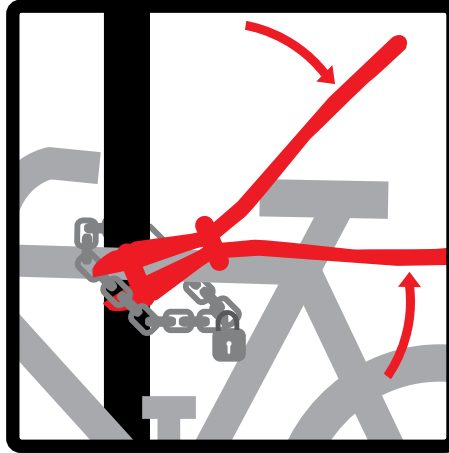
Given the opportunity thieves may use a hammer and cold chisel to split a securing chain or lock.



Always ensure your lock is fitted so that it cannot rest upon the ground or other immovable surface. This will allow the lock or chain to move if it is struck, diffusing the force of the strike and keeping your lock or chain in one piece.

## cutting

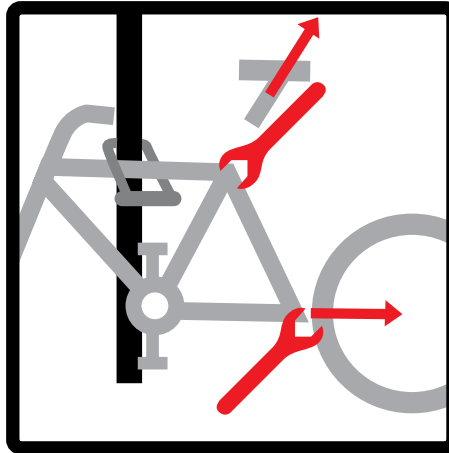
Thieves are known to use tinsnips, bolt cutters, hacksaws and angle grinders to cut their way through locks and chains to steal bicycles.



Don't make it easy for thieves. Some locks, such as coil or cable type, can easily be cut using readily available hand tools. More robust cutting equipment can be difficult to defend against. Expect to spend up to 20% of the value of your bike on your lock. Look at [www.soldsecure.com](http://www.soldsecure.com) and manufacturer guarantees and security ratings to buy the best lock you can. **It is best always to use two locks to enable you to secure both wheels and the frame of your bike to the stand.** If you buy two locks go for different types e.g. a strong D-lock and a sturdy chain lock. This means that if the thief has the tools to defeat one type they may not be equipped to deal with the other.

## unbolting

Thieves know how to undo bolts and quick release mechanisms. If you lock your bike by the wheel alone this is likely to be all that will remain when you return. If you lock only your frame then a thief may remove your wheel(s). If you leave your wheel-less bike to pick it up later then the thief will likely return before you do and remove the rest of the bike if circumstances allow.



Always lock both wheels and the frame of your bike to the stand and remove any quick release accessories such as saddle and wheels. If you only wish to carry one lock then secure skewers are a good idea. These are available from most good cycle shops and do not allow unauthorised removal of wheels, meaning you only need to secure your frame to the stand.

## picking

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Thieves can insert tools into the lock mechanism itself and 'pick' it open.



Most good locks are designed to resist this technique. Check that yours is one of them. Also, make it harder for the would-be thief by securing your lock in such a way that the mechanism is hard to get at. Tightly secured to the bike and stand and facing into your bike. Whilst this makes things a little more difficult for you it will make it a lot more difficult for a lock picker.

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## DO YOU KNOW THINGS ABOUT 'THE ENEMY' THAT WE DON'T?

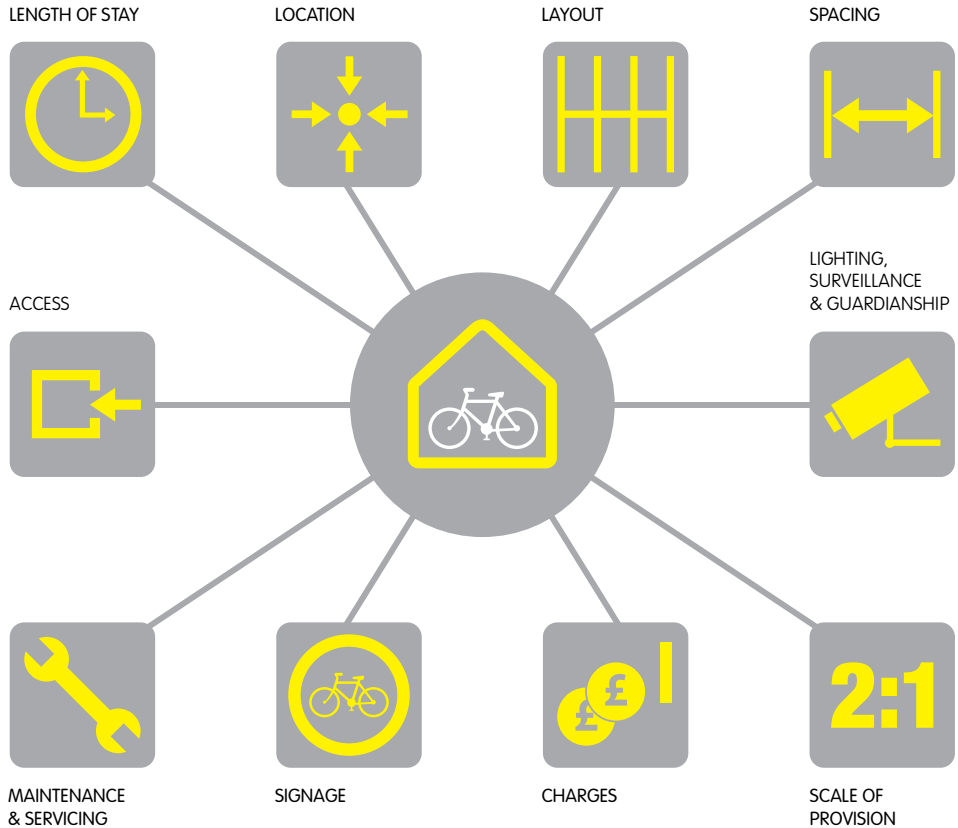
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Bikeoff has worked closely with PC Ike Gray of the Metropolitan Police to identify the common bicycle theft perpetrator techniques we have illustrated. We know that bike thieves are some of the most "adaptive" criminals (Ekblom 1997), so if you are aware of other techniques we haven't documented please tell us about them by logging onto [www.bikeoff.org](http://www.bikeoff.org)

# HOLBORN GATEWAY PROJECT

Since July 2005 Bikeoff has been working with Transport for London (tfl) and London Borough of Camden to review the cycle parking outside Central Saint Martins (CSM) College of Art and Design, a typical on-street cycle parking provision. The cycle parking is located at the junction of Southampton Row and Theobalds Road in Holborn, a bicycle theft 'hot-spot' according to Metropolitan Police data.

The first phase of the project included observing 8500 incidents of cyclists locking their bicycles to learn what is good and bad about the current facilities and their use, mis-use and abuse from the viewpoint of bicycle theft. The project will address the key considerations for secure cycle parking provision identified within Bikeoff research and illustrated here. It will culminate in the design and implementation of a 'benchmark' example of secure cycle parking serving cyclists in the Holborn Gateway area.





## LOCKING DATA

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75%

of users of the site rode bikes of standard 'diamond frame' design (with top tube).

19%

of cyclists locked the bike frame only; securing the top tube to the stand stand. This may be to stop the bike from falling.

22%

of cyclists locked the back wheel.

87%

of cyclists used one lock.

31%

of cyclists locked the front wheel.

## KEY STAND REQUIREMENTS

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1. Reduce opportunities for insecure locking practice (like locking only the top tube to the stand).
2. Support bike from falling and front wheel from falling to the side.
3. Increase security for one lock users.
4. Long stay parking should be located off-street. So the Holborn Gateway facility should cater for short stay (0-2 hrs) and medium stay (2-6 hrs).

'Broken bike effect' – fallen and damaged bikes deter stand usage. Those adjacent to them are least popular.

# M STAND STRAIGHT (\*M STAND)

Length of stay: Short

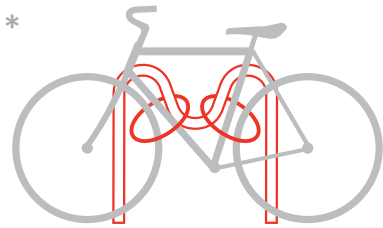
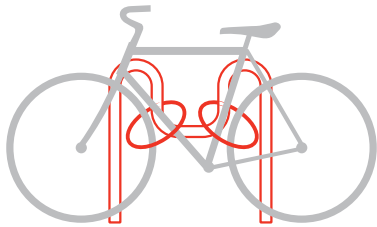
Material: Galvanised steel with powder coat

Material thickness: 3mm

Tube diameter: 48mm

## Features

1. Unique 'M' design denies opportunity for cyclist to lock top tube to stand – the most common form of insecure locking practice (Holborn Gateway research shows 19% of cyclists lock this way) – also avoids rotational 'levering' of cycle against stand.
2. M peaks provide support to bicycle at seat tube and head tube.
3. Centre section of 'M' is located high enough from floor to ensure locks will not rest on floor, thus avoiding 'striking', a common theft technique.
4. M design presents stand to bicycle frame closest to desired locking points – where back wheel is closest to seat tube and where front wheel is closest to down tube.



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# OFFSET M STAND

Length of stay: Short

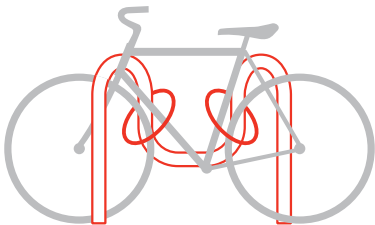
Material: Galvanised steel with powder coat

Material thickness: 3mm

Tube diameter: 48 mm

## Features

1. Unique 'M' design denies opportunity for cyclist to lock top tube to stand – the most common form of insecure locking practice (Holborn Gateway research shows 19% of cyclists lock this way) – also avoids rotational 'levering' of cycle against stand.
2. Bicycle is supported at seat tube and head tube (and forks). Offset design encloses front wheel, stopping bike falling and/or front wheel falling to side, avoiding obstruction to others and damage to bicycle.
3. Centre section of stand is located high enough from floor to ensure locks will not rest on floor, thus avoiding 'striking', a common theft technique.
4. Positioning of 'offset' support and dimensions of stand presents stand to bicycle frame closest to desired locking points – where back wheel is closest to seat tube and where front wheel is closest to down tube.





# FRONT WHEEL ENCLOSURE STAND

Length of stay: Short

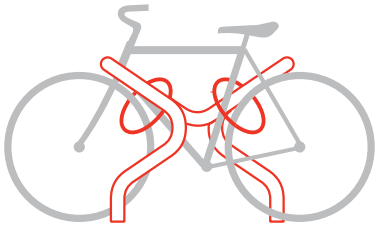
Material: Galvanised steel and powder coat

Material thickness: 3mm

Tube diameter: 48mm

## Features

1. Unique enclosure design denies opportunity for cyclist to lock top tube to stand – the most common form of insecure locking practice (Holborn Gateway research shows 19% of cyclists lock this way) – also avoids rotational ‘levering’ of cycle against stand.
2. Enclosure design and dimensions provide support to bicycle at seat tube and head tube and enclose front wheel stopping bike falling and/or front wheel falling to side, avoiding obstruction to others and damage to bicycle.
3. Centre section of stand is located high enough from floor to ensure locks will not rest on floor, thus avoiding ‘striking’, a common theft technique.
4. Angle of centre section of stand and external support bars present stand to bicycle frame closest to desired locking points – where back wheel is closest to seat tube and where front wheel is closest to down tube.
5. Enclosure design encloses front wheel, whilst central ‘V’ of stand offers locking site for back wheel and seat tube. A tight fit of locked bike to stand would also offer some protection to an otherwise unsecured front wheel, as bike could not be manoeuvred easily to remove frame from front wheel.





# PAGODA STAND

Length of stay: Short

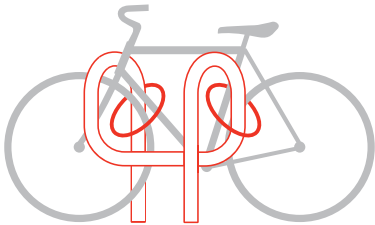
Material: Galvanised steel and powder coat

Material thickness: 3mm

Tube diameter: 48mm

## Features

1. Unique 'Pagoda' design denies opportunity for cyclist to lock top tube to stand – the most common form of insecure locking practice (Holborn Gateway research shows 19% of cyclists lock this way) – also avoids rotational 'levering' of cycle against stand.
2. Pagoda design and dimensions provide support to bicycle at seat tube and head tube and enclose front wheel stopping bike falling and/or front wheel falling to side, avoiding obstruction to others and damage to bicycle.
3. Horizontal centre section of stand is located high enough from floor to ensure locks will not rest on floor, thus avoiding 'striking', a common theft technique.
4. Loop construction encloses front wheel, whilst curve of opposing loop offers locking site for back wheel and down tube. A tight fit of locked bike to stand would also offer some protection to an otherwise unsecured front wheel, as bike could not be manoeuvred easily to remove frame from front wheel.





# CHAIN STAND

Length of stay: Medium

Material: Galvanised steel and powder coat

Material thickness stand: 3mm

Tube diameter: 48mm

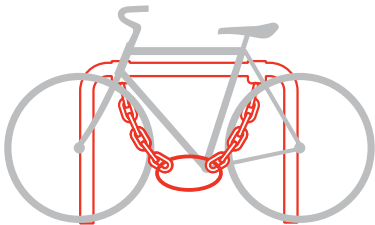
Material thickness fixing plate: 5mm

Material chain: Toughened steel

Material thickness chain: 5mm

## Features

1. 'Sheffield' stand core is familiar to cyclists, which means bicycle positioning in relation to stand is intuitive.
2. Stand height supports bicycle during locking procedure.
3. Mount plates fitted with anti-tamper bolts located 550mm apart to present chains close to desired locking points (down tube/front wheel and seat tube/back wheel).
4. Chain length allows for chain to pass through both wheels and frame of bicycle enabling both wheels and frame to be secured to stand with one lock (D-Lock or padlock).
5. Fixing plate construction secures chains to stand whilst denying any opportunity to lever chains apart from stand. Collar secured with security bolt.
6. Potential for chains to be retro-fitted to existing stands where additional security is required.





Bikeoff would very much like to thank London Borough of Camden, Transport for London and the Arts and Humanities Research Council/ EPSRC Designing for the 21st Century Initiative ('Bike Off 2 – Catalysing Anti Theft Bike, Bike Parking and Information Design for the 21st Century' ) for funding that enabled research for this project to happen. Also to our colleagues and collaborators, **Reg Bradbury** (Director, Broxap), **Glenn Cooke** (Broxap), **Chris Nicola** (London Borough of Camden), **Ike Gray** (Metropolitan Police), **Rose Ades** (Cycle Centre for Excellence) and **Andrea Casalotti** ([www.velorution.biz](http://www.velorution.biz)) for the loan of the 'Scorcher City 3 Speed' as featured in all stand images.



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