

OYBike

“A self-service bicycle rental system, activated by mobile phone”





Image: OYBike rental point.

Facility:

On-street bicycle hire by means of automated locks that are mounted on standard U-stand bicycle parking furniture, with rental and return of bicycles via user's mobile phone.

Provider:

OYBike Systems Ltd.
 Suite No 1, 2nd Floor, AMC House, 12 Cumberland Avenue,
 London NW10 7QL
 Tel : 0845 226 5751
 Email : info@oybike.com
www.oybike.com

Supplier / Manufacturer of System Equipment:

Bikes, software and components supplied by OY Bike Systems Ltd.

Secure electronic locks supplied to OYBike by Homeport.
www.homeport.info

Technology developed in partnership with Tari Digital.

Designer / Architect:

Bernie Hanning, OYBike Systems Ltd.

Cost of Provision:

Approximately £500 (€625) per unit installed (holds 2-3 cycles), plus bike costs (which vary with quantity required).

100 bike system – capital approximately £63,000 (€79,000)

Approximate ongoing costs of £25 (€32) per bike/ month.

OYBike promote some of these costs as being recoverable via income from on-bike advertising panels, although in practice, the uptake of this seems to have been limited.

General Description:

An automated on-street cycle hire system, first piloted in the Hammersmith and Fulham borough of London (2004); more recently it has been rolled out in parts of other UK cities and also Chicago university campuses, USA. The system differs from some of the major third generation cycle hire systems (e.g. from Clear Channel or JC Decaux), in several ways: (1) the method of user interface with the rental stations is via mobile phone, rather than 'smart cards' or swipe-cards; (2) the electronic locks are mounted on standard U-stand bicycle parking furniture – either stands already installed on a street, or new ones can be installed with the system, without the need for any IT or physical infrastructure; (3) unlike some of the competing offers from international urban furniture companies, the OYBike system does not require a city advertising or street furniture contract to be taken out with the company, to be able to acquire the cycle hire scheme; and (4)



Image: Panels that can be used for advertising.

The system has no minimum or maximum capacity, technically or contractually, meaning small clusters can be introduced to an area, and moved between U-stands to suit demand, before expanding the scheme should it prove popular.



Image source: Tdrury

Bikes are parked to, and rented from, the electronic lock, which is controlled through a keyboard and LCD display. The locking unit holds the cable secure until that bicycle is rented out. Once registered, users can borrow (release) and return a bike by entering the one of two unique codes, which are sent as texts to their mobile phone when they call the number shown at the rental station. The user's phone receives a pin number to unlock the bike at the start of a journey and a second one to lock it at the end and, which also determines the time rented and how much the rider is charged.

Location of Facility:

OYBike targets its system for these types of locations:

- City Centres
- Underground stations
- Public buildings
- Key transport interchanges
- Car Parks.

It has established or tested schemes in London (various sites), Reading, Cheltenham, Cambridge, Farnborough, Southampton, Manchester (pilot), Chicago USA (university campuses).

The first pilot scheme for this system was run in the Hammersmith and Fulham area in London, launched in July 2004.

Current UK locations can be seen at:

<http://www.oybike.com/OYBIKE/obhome.nsf/locations.html>

Scale (capacity):

Up to 3 bikes can be parked per OYBike parking unit. One station can be installed on a standard U-stand. The Hammersmith pilot introduced 25 locations and approximately 50 bikes.



In practice, some of the first criticisms to emerge from the Hammersmith pilot were that many potential-users want to cycle beyond the limits of their own borough and many more stations would be needed around central London to make the scheme more attractive. This issue is being addressed in London to some extent, now that more local councils have been facilitating OYBike schemes, but all 31 councils would need to cooperate/jointly fund it. At the time of writing (July 2008), there are 62 OYBike locations listed (estimated 125 bikes) around the city. This is still not enough to compete with schemes on the scale of Paris or Barcelona and others but is an improvement over the pilot-scheme availability.

In common with nearly all automated rental schemes, some OYBike users report problems with too many bikes being parked or rented at once at the more popular locations. For example, rental points outside a tube station will have all the available bikes quickly taken in the morning and in the afternoon/ evening, they may fill up quickly leaving no opportunity to return bikes at that point.

Charges (cost to user):



Colours are distinctive, even if the bikes are not stylish.
Image source: OYBike.

Users pay an initial fee of £10 (annual) and then are then charged based on usage. The account is topped back up once usage reduces the balance. Rates can vary between OYBike scheme locations, but typically are as follows:

Hire time	Cost
0 – 30 Minutes	Free!
31 minutes – 60 minutes	£2.00
61 minutes - 120 minutes	£4.00
121 minutes – 180 minutes	£6.00
Over 181 minutes (whole day charge- 24 Hours)	£8.00

After that each day or part of a day will be charged at £8.00. Optional theft insurance is available at additional at a cost of £10 per annum. Users without this or any other insurance cover are potentially liable to pay the full cost of replacing the hired bike in the event of loss or damage.

Length of use:

The OY bikes sit parked on the street and are available for rental 24 hours a day.

Rental pricing (below) is targeted to encourage a variety users, from those making short trips of half an hour or less to those who rent the cycles for a working day or more – this mixed use strategy is intended to help with even cycle distribution between rental stations in different locations.

Access:

Nearly all OYBike stations that are available for public use are located on street (some others are limited to users of business or university campuses). Access on approach to an OYBike installation is, in most cases, as simple as access to any public U-stand cycle parking facility.

Signage:

Being a system without any specific architectural installation, the only signage related to the OYBike schemes is on the parking station hardware and the bicycles themselves.



The green and yellow colour scheme has become an integral part of the OYBike identity in all locations where it has been installed. The brightly painted bicycles are distinctive, at least, and this helps make the rental points noticeable from some distance. Without bikes parked at the rental points, the stations can be harder to locate for customers looking to park hired bikes.



The electronic locks have an 'OYBike' sign mounted on the reverse and a yellow panel to the side of the interface, which both help attract attention, but there are no on-street maps or other indications available of where other parking stations might be located, for 'A to B' use of the cycles. For maps and availability of the stations, users must log on to the OYBike website at www.oybike.com/OYBIKE/obhome.nsf/locations.html. This page gives good 'Google-map' type location information but since it is only online, this means new users of OYBike have to pre-plan their trips carefully thus limiting some of the freedom offered by automated cycle hire schemes. OYBike indicate that maps and rental station information can be downloaded to registered mobile phones although the extent or quality of this service is not known.



Image source: OYBike

System Interface:

The OYBike system is built around four main components

- The mobile phone - the user's communication medium.
- The rental station.
- The bicycle with the locking cable permanently attached.

- An automated call centre and integrated computer system.



Users receive a text message with instructions

How do users interact with the system?

Before the first rental, new users must 'pre-register' with their mobile phone using a number provided at each station, and provide their credit card details for security. The consequent process of hiring and returning OYBike cycles can be time consuming, compared to other more recent automated public/ city bike rental schemes, although it has been simplified steadily since launch in 2004. The current steps, as described on the OYBike website are as follows:

To start the hire:

1. *The subscriber selects bike they wish to hire.*
2. *Subscriber calls OYBike control centre, an operator will answer their call.*
3. *They will be prompted to read the number, which is displayed on the OYBike docking station.*
4. *This number will be decoded and a simple authorisation check will be made.*
5. *A release code will then be given back to the user (or sent as SMS to mobile phone) allowing them to enter it into the OYBike docking station to release the bicycle.*
6. *Hire commences.*

To end the hire:

7. *Subscriber will find an empty port at any OYBike rental station and plug the bike into the port.*
8. *The Subscriber will call the OYBike control centre and provide end of hire confirmation code displayed on OYBike docking station.*
9. *Hire ends.*



Image source: OYBike



Image: OYBike docking station.



Image source: OYBike

Once users get accustomed to the system, the process becomes a little quicker since they can depend more on text-messaged codes, without the need to follow the longer automated call process. Transaction time for release is promoted as 30 seconds, although some new users report it can easily take several calls and several frustrating minutes, during the first rentals, while they get to grips with the system.

OYBike has suggested that users will soon be able to use infra-red functionality of their phones, making renting or returning a bike still swifter. Bikeoff questions whether blue-tooth technology might not be another possible option, given more mobile phones have this technology built in at present.

If during hire, the user discovers the bike has a problem, they can return the bike and let the call centre know and they will not be charged for that use. If the bike is damaged, vandalised or stolen during the care of the registered user, and it is deemed to be their fault OYBike will charge the cost of repair or replacement to the user, hence the optional £10 per year insurance that it offered.

The 'Docking Station':

The OYBike docking station device uses an algorithm to generate ID numbers, which identifies the cycle and port, then, from this enables the system to generate a release code.

The Bicycle:

OYBikes communicate their identity to the docking stations via a passive RFID chip built into the cable lock of the bicycle.

The Automated Call Centre:

The IT system, is supplied in partnership with Tari Digital¹ and has a



Image: Key buttons in the rental process, such as 'OK' are not marked on the keypad: use depends on the screen.

central telephone number that identifies all incoming calls. The system checks the Number against authorised users and answers the phone call with pre-programmed prompts according to the user's requests. The call centre database records all the transaction details for that incoming number and transfers the data to a billing schedule.

Furniture/ Parking equipment:

Each U-stand used for the OYBike scheme is equipped with a specially developed electronic lock, or 'docking station', operated through a keypad and LCD display. This lock, based on an existing unit developed by Homeport², is designed to secure the bicycle via its the cable built in to the bicycle, until it is rented out. Each docking unit can park up to three bicycles. OYBike recommend one unit for every two bikes in a scheme, so that there is space to park bikes, too.

These stations are most commonly mounted to existing or new U-stands but can also be bolted to walls or other secure fixing points. They are powered by durable, rechargeable batteries, which means no wired or physical network installation work is required. This allows stations to be installed wherever deemed appropriate and is not dependent on having racks of 20 or more bikes at a time, linked to a local control unit.

Bikes and stations can be provided in small or large clusters, and individually relocated according to user habits and forecast demand. This can be especially beneficial for schemes in towns wanting to have flexibility, or wanting start small and expand later. Within an existing OYBike scheme area, docking stations can moved around between any U-stand or new ones installed relatively easily. OYBike state that they can be bolted in place and be set-up in about an hour, where the service is already in operation for that area.



Image source: OYBike

The units seem durable, with only occasional reports of failure or

vandalism. However, in use and appearance, the objects suffer somewhat for having been almost directly transferred from other Homeport applications. While the software has clearly been designed from the ground-up for the OYBike system, the hardware is almost identical to Homeports used in other industrial or commercial applications³ As such, details like the keypad buttons are generic, rather than being printed with OYBike related commands. This does not help in the process of getting used to how the service works. Furthermore, the visual design of the unit presents as an industrial object targeted at wall-mounted, eye-height use. The size of the screen and the numerous different buttons, do not help make the rental process easier. A considerable improvement for all OYBike schemes would be a redesign of this unit, centred around the OYBike user experience.



Next to the electronic unit, a panel is mounted presenting the rental instructions. It is unfortunate that this information is text-heavy, not visual, and being presented in small dark type on the bright yellow background, it could be mistaken for a statutory traffic advisory panel, which does not necessarily encourage people to read it all carefully. A panel showing the rental steps as a simply visualised and annotated process would be a vast improvement on this display.



Bicycles used with this system:



The bikes used in OYBike schemes are unique to this system and have resistant features such as hub gears, hub brakes (on newer models) and shaft drive. The bicycles are secured to the bike stands using cables that are attached to the bicycle and which double as security locking cables when the bicycles are on hire.

The bikes are designed for low-maintenance and high weather and vandal resistance. Features include:

- No Chain
- Shaft Drive Transmission
- 3 speed
- Non removable adjustable saddle height
- Rear carrier with advertising panels
- Temporary combination lock
- Permanently attached security cable & storage
- Puncture resistant tyres.

They are also fitted with fitted dynamo lights and wire-mesh baskets, which sometimes seem filled with litter by passers by, while the bikes are parked. The Clear Channel type of handlebar frame that integrates a simple tubular steel structure and elasticated 'shock-cord' to secure belongings, manages to avoid this common problem of littering in cycle baskets.

While the bikes appear as fairly traditional in style, they do not have parts that are interchangeable with other bikes and components are fixed with security screws. This helps reduce theft of parts and accessories and reduces their value on second-hand or black-markets. Although some reports indicate that there have been some problems with theft and vandalism, it is not known how many, due to a lack of transparency on this subject.



It seems the bikes have proved mostly reliable among the relatively small OYBike schemes set up so far but it is perceived that with greater use, of bigger schemes for example, they could deteriorate too quickly. Some of the components, such as the basket, the wired dynamo lights, the large wire-spoked wheels, the combination lock, the rear rack and other parts, are probably not yet simple enough or sufficiently resistant for large citywide schemes, without a serious amount of maintenance.

In addition, the traditional style of these bikes is not in keeping with the newer designs being developed for other twenty-first century third generation city bike schemes. Guardian reported Simon Mills is quoted in regard to these bikes' appearance: "rent an OYBike in London and look like you work for a sandwich delivery outfit". A simpler, more distinctive form to the OYBikes and modernised appearance would likely help the system gain popularity in face of other competitors and among many more urban cyclists.

Security, Guardianship and Lighting:

Being an automated on-street scheme, there are no appointed on-site guardians, and the lighting depends entirely on the ambient light at the location of each respective installation, which is normally in line with public street lighting standards, at least.

The OYBikes have built-in security via locking cables. Each cable has an integrated chip so that the OY Bike lock can recognise each individual bicycle. It is not known how easy or hard it would be to cut the locking cable with a set of good bolt croppers.

The distinctive yellow bicycles employ many anti-theft hardware fixings to prevent loss of components and have been designed with a shaft-drive transmission instead of a traditional chain, which is less prone to vandals than a traditional chain.

Statistics available for the Hammersmith and Fulham pilot, suggest that by September 2006, no OY bikes had been stolen up to that stage, from the launch in July 2004, although anecdotal reports indicate that since then some have gone missing from there and from newer locations too.

In keeping with the nature of other third-generation cycle hire schemes, the rental process is linked to a database check to identify user and cycle identities. When a user calls OYBike from their mobile phone to rent a cycle, the incoming telephone number is checked. The system then establishes who, where and which OYBike, by requesting the codes displayed on the Homeport.

Maintenance and Servicing:

The contract taken out with OYBike to install a scheme normally includes all the elements of management and maintenance of the system.

The call centre and the automated system interface can be set up in any language. The IT system of the call centre manages the data in respect of user patterns and produces reports about habits, problems, etc.

Official details are not available for the maintenance of the bikes or docking stations, but it is estimated that the need for product repairs or replacement is relatively high.

OYBike suggest that the first 3-4 months after installation are likely to reveal any possible teething-problems with logistics, thefts, vandalism, and alter that people get used to the system as a normal part of urban street fabric and problems reduce.

Service Period (how long facility meant to last):

As a system, indefinite - with periodic service, regular maintenance to bikes and tech and hardware updates electronic parking stations.

Strengths:

The robust nature of most of the components and non-networked nature of parking stations allows them to be easily installed without any civil engineering or architectural works. There is no requirement for an IT connection to be installed since the electronic locks are 'self-contained' and rely on the user's mobile technology. There is flexibility in that the stations can be moved, as necessary according to patterns of demand and use, which can be perceived via the system's web-accessible database. The result is an economic, secure and adaptable system, which is available to users round the clock. Other benefits include:

- Lower start-up costs for small schemes, than many other 3G city bike systems.
- Uses existing bike parking stands.
- Increases U-stand capacity (up to 3 OYBikes per station/side).
- No installation of shelter or enclosure required to issue or store the bikes.
- No infrastructure or public works requirement.
- Installation and removal of docking stations is a quick process.
- Bikes available 24/7 and 365 days per year.



Weaknesses:

- Slightly over-complicated rental process, compared to RFID card-based 3G bike systems.
- Issues with distribution of bikes at peak periods.
- Issues with limited usefulness where the scheme is only set up in small pockets and does not serve wider areas.
- Interface and design of current docking stations is not ideally suited to the OYBike rental process.
- To some, the bike designs are unattractive or not modern enough.
- Issues with vulnerability of some components of the bike.

Marcus Willcocks July 2008

Further Statistics on the OYBike Scheme:

Very little information has been released on the total number or frequency of OYBike users, either in one given area, or across all locations installed.

It has been established that it is important to have a hire system which has a variety of users - the current system in Hammersmith claims to require less than 1% of the fleet to be moved around to meet demand because of this diversity of users - a group with a strong flow will produce a similar problem to bus and train use at peak hours - a need to have dead journeys (bikes shipped on trailers/in vans to meet demand) the biggest imbalance on the test system occurring at weekends.

Useful References:



OYBike <http://www.oybike.com>
Homeport <http://www.homeport.info>
Tari Digital <http://www.taridigital.com>

Guardian review:
<http://www.guardian.co.uk/travel/2007/aug/20/london.travelandtransport>

OYBike Hammersmith:
<http://news.bbc.co.uk/2/hi/technology/3856535.stm>
http://www.treehugger.com/files/2006/05/oybike_system_1.php
<http://www.hfcyclists.org.uk/OYbike1.htm>
<http://www.bikeiowa.com/asp/hotnews/newsdisplay.asp?NewsID=739>
http://news.bbc.co.uk/nolpda/ukfs_news/hi/newsid_3856000/3856535.stm

OYBike Reading:
http://news.bbc.co.uk/2/hi/uk_news/england/berkshire/7369937.stm
http://www.getreading.co.uk/news/s/2030446_on_your_bike_for_journey_to_work

OYBike Chicago:
http://www.sxu.edu/relation/news_story.asp?iNewsID=791
http://www.sxu.edu/SharedDocuments/CAM-Facilities_Mgmt/bike.pdf
<http://www.oybike.com/OYBIKE/obhome.nsf/press/5F30251168735A5D8025745E0047B6D6>

Manchester OYBike trial:
http://www.bbc.co.uk/manchester/content/articles/2005/09/16/oybike_160905_feature.shtml

¹ Tari digital "is a leading-edge e-business consultancy providing solutions in Lotus Notes, Domino, WebSphere, Hand-Held technologies and more. Tari digital has incubated the OYBike project providing all the technical and software development resources, helping OYBike realise a sophisticated, robust solution". www.taridigital.com

² Homeport "Homeport' secure electronic locks for use in the OYBike system. The small size and low cost of the Homeport has contributed to the efficiency of the system in maximising coverage of the target rental area whilst providing a high density of bicycle stations". www.homeport.info

³ See http://www.homeport.info/what_is_it.shtml