TRANSPORT RESEARCH LABORATORY

Bike on trains — a study of potential users

Prepared for Charging and Local Transport Division, Department of the Environment, Transport and the Regions

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TRL REPORT 402

First Published 1999
ISSN 0968-4107

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Executive Summary

This research has examined the potential demand for the carriage of bicycles on trains among three traveller groups: ordinary train passengers; those who travel to the station by bicycle; and cyclists who travel to leisure destinations by car.

The number of people expressing a genuine intent to use the bike racks is low. Principally this is because there is only a limited number (4) of racks per train and passengers are recommended to reserve a bicycle space in advance, and there is a fee for carriage of a bicycle.

Approximately one third of all respondents felt that taking their bike on the train would have some advantages, such as providing an easy and quick getaway from the arrival station to their final destination. The next biggest advantage was the avoidance of theft arising from insecure parking facilities at and around stations.

Disadvantages of the bike racks conflict with this desire to make the journey 'easy' in that taking bikes on trains is thought to be obstructive to passengers without bikes. Those interviewed who had travelled by car to areas served by train said that one of the main deterrents to rail travel was the fear of traffic on the journeys to and from stations. Generally, rail travel was thought by car users as being simply too inflexible for leisure use.

Walking is a particularly important mode of transport to support journeys by train. The mean distance walked to the destination station is around 1.5 miles, and onwards from the arrival station it is 1.0 miles. The availability of a bike might increase this by one additional mile and the viability of bike carriage might then depend upon the number of people with origins or destinations in this increased catchment area. However, the concept of a suitable cycling distance includes consideration not just of distance, but of facilities at the trip end.

The most frequently quoted requirement to increase the number of people using the rail and bike combination was the provision of improved sheltered cycle parking at stations. Given that cyclists may be exposed to inclement weather on their way to the station, they would also appreciate warm waiting rooms (and more reliable trains).

Unfortunately, what is needed to promote the increase in carriage of bikes on trains may, from the findings of this research, be in some cases insoluble. At peak times train operators have to provide a service that optimises passenger space, but cyclists want maximum possible cycle carrying space. At off peak times, train frequencies must reduce, but leisure cyclists need the flexibility of frequent trains.

The bike racks on Anglia Railways have been highly successful in raising the profile of the issue of carrying bikes on trains. Considerable interest has been shown by other train operating companies, many of whom have gone on to provide initiatives of their own. The findings of this research suggest that bike racks will make a contribution towards reducing car dependency and increasing cycle use. In practice this is not so much because they facilitate modal transfer to cycling in large numbers, but because they are a visible, awareness-raising sign that cycling is becoming an accepted and encouraged transport mode that everyone can consider on all types of journey.

1 Introduction

This report presents the findings of research investigating the impact of providing cycle storage facilities on trains in the Anglia Railways region in Suffolk and Norfolk. These were introduced as part of 'Cycle Challenge', an initiative of the Department of the Environment, Transport and the Regions' (DETR - formerly the Department of Transport). Launched in July 1995, Cycle Challenge invited commercial, voluntary and public sector organisations to produce innovative designs and partnerships which would help promote cycle use, particularly for local journeys.

1.1 Background

In December 1995, almost £2 million was allocated among the 62 successful Cycle Challenge projects. These included schemes to encourage cycling to school and to work; the installation of secure cycle parking in town centres; the purchase of pool bicycles for offices; the provision of cycle trailers at supermarkets; cycle promotion campaigns; village initiatives; the implementation of town centre cycle centres.

One of the issues identified in the National Cycling Strategy (DOT, 1996) was the need to combine cycling with other sustainable modes to enable longer journeys to be made. Specifically, the strategy recommended secure cycle parking at all public transport interchanges by the year 2000. Train operators were urged that, as railway rolling stock is refurbished or renewed, they should provide sufficient flexible space on all passenger trains to carry bicycles.

This report focuses on a project in the Anglia Railways Region in which rolling stock was fitted with specially designed cycle racks (Plate 1). The design, in accordance with the requirements of the railway inspectorate, is substantial and has straps to secure cycles in the event of an accident. Cyclists were advised to reserve a place and initially had to pay a flat fare of £3 (subsequently reduced to £1) per ticket (single, return, or day rover). The racks provide four bicycle spaces per train.

Plate 1 The bike racks fitted on trains in the Anglia Railways region

1.2 Aims and objectives

This investigation was part of a wider project for DETR that aimed to assess the effectiveness of a selection of Cycle Challenge schemes. Previous Cycle Challenge assessment reports covered Cycling to School (Gray et al, 1997) and Cycle Centres (Gardner et al, 1998).

This report looks at the contribution to cycling that might be made by adapting trains to carry bikes. The study had three specific objectives:

- to assess the potential of the new cycle racks to promote modal transfer from car to the combination of bikes and trains;
- to review the obstacles which prevent people from using a bike rail combination in general;
- to establish the obstacles which currently prevent more people from using the Cycle Challenge bike racks.

It should be noted that, although several respondents had used the new bike racks (and their views were recorded), this research did not specifically target users of the racks. The Cyclists' Public Affairs Group/Bike Rail is undertaking a separate study for Suffolk County Council to examine the views and experiences of these users.

1.3 Methodology

In order to meet the aims and objectives of this research, the following groups were selected for survey:

- ordinary passengers selected at random who were travelling on trains fitted with racks;
- those who cycled to the station but did not take their bikes with them on the train;
- leisure cyclists who took their bike by car to destinations served by trains.

This survey was to obtain the views of those groups who had the potential to switch to cycling as a result of the new bike racks. The sample included leisure, as well as utility, cyclists to reflect the touristic potential of the region which serves the coast and the 'Broads'. Passenger interviews took place during peak commuting and off-peak periods.

Most of the journeys involved local travel to and from stations in the Anglia Railways region, with some passengers travelling into London or further afield.

2 Passenger survey

A sample of passengers on Anglia Railways local trains were surveyed over a two-day period in June. This resulted in 114 completed questionnaires, with a fairly even gender split (52% male 48% female) and a good representation of occupational categories. For convenience, these respondents will be referred to below as 'ordinary passengers'.

For the initial leg of their journey most ordinary passengers travelled to the station either by foot (39%) or by car (31%). Distances travelled to the station were between 0 and 5 miles (84%). At their destination, distances were similarly short, with 27% travelling less than one mile, and 66% on foot. When asked about the availability of a car,

45% of ordinary passengers said there was one available that they could have used for the whole journey.

In order to establish how travel patterns might vary, respondents were asked whether they ever used an alternative to their preferred mode. Most (61%) said that they never changed their mode, but of the 39% who did, reasons given were time constraints, weather or simply 'convenience'.

A total of 7% arrived at the station by bicycle, considerably more than the national average of around 2% of all journeys (although Suffolk does have approximately twice as many journeys to work by bicycle than the national average, NTS, 1990). Most ordinary passengers either never cycled at all (45%) or cycled less than once a month (8%). However, 27% cycled at least 3 days per week and a full 40% cycled at least once a week.

2.1 Bike and rail – ordinary passengers

When asked the open question 'What do you think would encourage you to cycle to the station' (and before racks had been mentioned in the survey) 37% of ordinary passengers said that improved cycle parking security would. Only 4% mentioned bike lanes, and only 2% mentioned anything about the cycle racks.

When asked what they thought would be the general advantages of taking a bike on the train, the ordinary passengers mentioned quicker door to door journeys (16%) and an easy getaway from stations (14%). Other advantages included facilitating leisure cycling (8%), being independent from other transport modes (8%) and being able to use a bicycle over longer distances (5%).

One principal disadvantage of taking a bike on the train was considered to be station/train access for bicycles (21%). Specifically mentioned were difficulties due to problems with taking bikes up and down stairs, a feature of several stations in the Anglia region. Equally important was 'having less room for passengers' (21%). Passengers anticipated that, if using a bicycle, this would be a particular problem at peak times, for example, pushing a bike through crowded ticket halls, or using the bike racks when people are standing in that area on the train. Other disadvantages included the extra cost (15%), finding a safe place to leave your bike/increased opportunity for theft (15%), and the disadvantage caused to other passengers by miscellaneous difficulties such as slower boarding times.

2.2 The new bike racks – ordinary passengers

Respondents were asked a number of specific questions about the new bike racks on Anglia Railways local trains. The majority (61%) had learnt about them, either by seeing them (44%), through word of mouth or as a result of Anglia Railways' promotional leaflets and posters. Around 60% agreed (22% strongly) that the racks made it more likely they would take a bike with them and 17% disagreed. However, when asked if they specifically intended to use them in the next 6 months, most said definitely not (34%) or probably not (29%). A total of 31% said they would take their bikes on the train, but less than once a month, and 3% said they would take their bikes with them on the train once a week or more.

The main barrier to using the racks would appear to be the recommendation to reserve in advance and the need to pay for a space for a bicycle, considered a problem by 69% of respondents (including a serious problem for 20%). Storing the bike on the train (despite the racks) was still a problem for 59% (serious for 10%). Accessing the platform with a bicycle was considered a problem by 52% of respondents (serious for 18%). The physical process of putting the bike onto the train was a problem with 44% of respondents including 10% who thought it was a serious problem.

To encourage greater use of the facility, 28% suggested financial incentives such as waiving the current £1 charge or offering cyclists reductions on the normal ticket price. 21% mentioned improving access to the bike racks by having an easier stacking system or having assistance with loading and unloading the bicycles. 25% said that there needed to be more trains with cycle capacity and not just in Anglia Region.

3 Passengers who cycle to the station

In order to discover the opinions of those who already use a bike and train combination, self completion questionnaires were attached to a number of bicycles parked at several stations in the Anglia Railways area. These stations included Norwich, Ipswich, Lowestoft, Great Yarmouth and Brundall (see Figure 1). These respondents are referred to below as 'bike and riders'.

A total of 51 questionnaires were returned. Most respondents (72%) were male and most were aged between 25 and 59 (82%). Although 44% of respondents had access to a car for their journey, all respondents cycled at least once a week, 43% cycled 3-5 days/week and 53% cycled a full 6 to 7 days/week.

Around three quarters of those returning the questionnaire were in full time employment. The principal journey purpose was commuting, accounting for 63% of trips. This was followed by leisure, business and education trips (all 10%).

At their destination station, 39% of respondents travelled onwards by foot, 22% took the underground, 6% cycled (using a second bike at their destination) and 10% went by bus with the others using taxi, car or combinations of these modes.

When asked if cycling was ever not suitable, 39% said that they sometimes used other combinations of modes for their journey. The main reasons for this included the weather (35%) and the need to carry heavy things (18%). Other occasions mentioned were during public transport strikes and when there was the need to pick up children.

3.1 Using bike and rail – bike and riders

For the bike and riders, the advantages of combining bike with rail were many and varied. Slightly ahead was speed (16%) followed by cost (14%). Being an environmentally friendly and healthy means of transport were both considered to be an advantage by 10% of respondents. Other plus points mentioned were the lack of stress, not having to worry about parking, and comfort/cleanliness and safety.

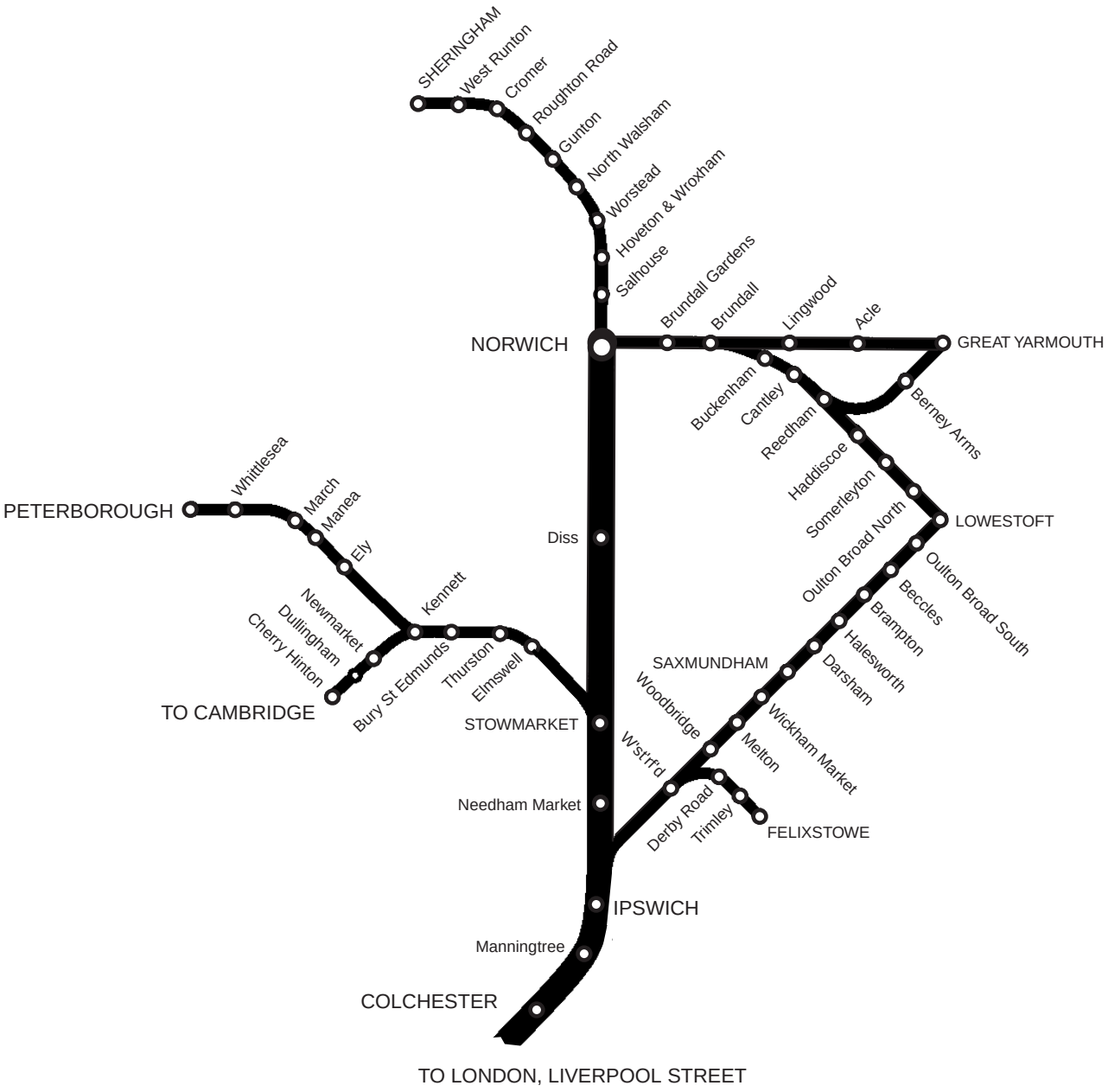

Figure 1 Map of Anglia Rail local services

The main disadvantage of this combination of modes was the weather (23%). This mainly related to the cycling part of their journey but was also mentioned in the context of having to wait for trains in poor weather conditions. General rail problems accounted for most of the bike and riders' remaining dislikes, with the unreliability of trains considered the next biggest disadvantage (by 15%) followed by the cost of rail travel (11%) and the problems of overcrowding (11%). An insufficiently frequent train service was mentioned by 8% and the danger of cycling by 7%.

Respondents were asked what would encourage them to cycle to the train station more frequently. The principal factor was improvements in cycle parking (37%). This figure included 24% who favoured increased security and 9% who would like to see more effective cover for cycle parking (Plate 2). The provision of bike lanes for the journey to the train station would be an encouraging factor for 17% of respondents.

Plate 2 The type of cycle parking typically provided at stations which provides no weather protection for bicycle or rider

3.2 Carrying bikes on trains – bike and riders

Although this sample had chosen not to, they could see some advantages in taking their bikes on the train. The principal advantages were having an easier getaway at the destination (39%), fewer security worries (14%), being able to save money (10%), the ability to use the bike over a longer distance (6%).

The main disadvantage of taking a bike on the train in general was considered to be the difficulty of loading and unloading bicycles (by 18%). This disadvantage was perhaps linked to the fact that the racks reduce capacity for other passengers (16%) and slow down boarding times (12%). For some, the main disadvantage was the need to book in advance (9%) and the additional cost (14%).

Awareness of Anglia Railways' bikes on trains initiative amongst respondents was 76%. Most had found out about them by reading the leaflet (41%) or word of mouth (23%). 38% said they had used the racks, at least once.

Respondents were asked about various aspects of the new bike racks, and 66% agreed that they made them more likely to take their bikes on the train (29% agreed strongly). When asked about their future use of the bike racks (over the next six months), 45% said they would probably not use them, 22% said they would use them less than once a month, 10% more than once a month and 6% more than once a week.

When asked closed questions about the practicality of using the Anglia bike racks, 41% said needing to reserve a place for their bike in advance and paying for its carriage was a serious problem and another 41% said it was a slight problem. 10% said gaining access to the platforms was a serious problem (26% slight), and lifting the bike on and off the train was considered a slight problem by 23%, and a serious problem by just one person. Storing the bike on the train, even with the new racks, was considered to be a serious problem by 14% and a slight problem by a further 42% of all bike and riders.

Respondents were asked what would encourage them to use the new Anglia Railways' bike racks. 39% said they would be encouraged to use them if they were free and 28% said they would be encouraged to use them if there were no requirement to reserve (or if the capacity was increased). Other factors mentioned included improving station access (9%), extending the bikes on trains facility to other rail operators (9%) and advertising the service more widely (7%).

General comments about taking bikes on the train included:

'four bike racks per carriage is not enough';

'separate carriage needed for cyclists';

'discount fares should be offered to the cycling passengers';

'currently no space for two families with bikes';

'a consistent pro-bikes policy is needed amongst all rail operators'; and

'platform access is difficult when busy'.

4 Potential catchment area for bikes on trains

This research permitted some investigation of the importance of distance travelled in determining modes used to reach origin and destination stations (Table 1). This showed that the journey to the departure station was slightly longer than that from the arrival station for most modes. It should be emphasised that these distances are as given by respondents and accuracy may be influenced by judgement and perceptions.

Table 1 Distances travelled as part of rail journeys (by most common modes)

Segment of journey	*Method*	*Mean distance (miles)*	*85 per -centile (miles)*	*Number surveyed*
To origin station	Car	4.1	7.5	37
	Bus	6.0	7.5	17
	Walk	1.3	2.5	46
	Bicycle	2.6	3.5	53
	All modes	3.1	5.2	161
From destination station	Car	4.3	7.5	18
	Bus	4.6	5.5	11
	Walk	1.0	1.5	95
	Bicycle	2.8	3.5	8 1
	All modes	2.6	4.5	65

Nearly a third (31%) of all motorists travelled less than the 2.6 miles average distance cycled to the train station, and 14% of motorists drove less than the average 1.3 miles distance travelled by those arriving on foot. This gives some indication of the potential for modal shift, especially as 37% of car users claimed to cycle for other purposes once a month or more.

In order to allow for the impact of journeys that are exceptionally long (three cyclists were on their way to a day's leisure ride, for example and these are excluded from the calculations) it is revealing to consider the 85 percentile. This indicates the value that is exceeded by only 15% of the sample and might provide some indication of the upper limit of what most 'normal' people would consider acceptable (Table 1).

One way of interpreting these results is that there is considerable overlap between walk and bike modes. A sizeable minority of walkers are already travelling almost up to the mean cycling distance. The walk mode is already regularly considered convenient for trips of up to 2.5 miles and dominates for the short trip at the destination end.

Another interpretation of the results is that the main contribution of the bicycle is to extend the catchment area at the origin station by around 1 mile and for the small sample at the destination station by around 2 miles. These distances are associated with useful increases in catchment population, as shown in Table 2. The table gives an estimate of how many people currently live beyond an acceptable walking distance but within an acceptable cycling distance. Any action that can encourage only a few percent of these to cycle to the station, rather than use a car, will be beneficial.

Table 2 The impact of increasing catchment area for a station based upon housing density estimate ranges from a 'typical' modern suburb up to the average for inner London

Change in catchment radius (miles)	*Additional area (Sq. miles)*	*Additional potential market (low to high density)*
1 up to 2	9.4	24,000 to 190, 000
2 up to 3	15.7	41,000 to 317,000

Figure 2 looks at catchment areas in a slightly different way. It shows that half of those travelling to the station by foot walked less than a mile. Most (75%) of the cyclists travelled between 1 mile and 2.9 miles to the station. 37% of the motorists travelled less than 2.9 miles and 74% less than 5 miles to reach the station. Over half the bus passengers, however, travelled more than 5 miles to the station.

In order to establish the economic activity of those travelling to the station, respondents were asked about the occupation of the chief wage earner in their house. Of those who currently cycle to the station, 82% reported this as senior or junior managerial. This compares with 58% of those who did not cycle to the station. In the (small) group of 'senior managers' there was a majority who travelled by bike to the station (13 by bike, 9 by car).

5 Leisure cyclist potential users

The third group of those potentially affected by the bike racks to be surveyed were those leisure cyclists who might be willing to transport their bikes by train. Leisure use is a fast growing and important aspect of cycling. One of the features of off-road leisure cycling as reported by Gardner (1998) is the predominant use of the car to arrive at the start of the journey. It is therefore necessary to consider this competing mode in any move towards encouraging the train for leisure journeys.

To establish the views of cyclists who travelled by car to the start of a leisure cycle ride which was also served by train, interviews were carried out in Tangham country park, Rendlesham Forest. Located 5 miles from Woodbridge station and 3 miles from the sea, the forest is popular with day trippers and weekend campers alike. There is a network of waymarked cycle trails, and cycle hire is available, although most users bring bicycles with them (using bike racks attached to their cars).

There was considerable difficulty in acquiring a suitable sample size as the numbers visiting the forest park was highly weather sensitive, and there was a competing leisure attraction at the time (the football World Cup). Eventually, 30 questionnaires were completed. As these were aimed at revealing qualitative attitudes (with quantities listed for guidance only) it was not considered cost-effective to prolong the surveys.

The sample, referred to below as 'cycling motorists', included 21 males and 9 females, most aged between 25 and 40. Around half had driven between 11 and 20 miles. Just over half lived within 3 miles of a train station. The nearest station to one third of respondents was Ipswich, which is on the same line as the nearest station to Tangham (Woodbridge).

The majority of the cyclists only use their bikes for leisure purposes. Others commute by bike or undertake shopping trips by bike. Half of the respondents cycled once or twice per week, the remainder cycled less frequently.

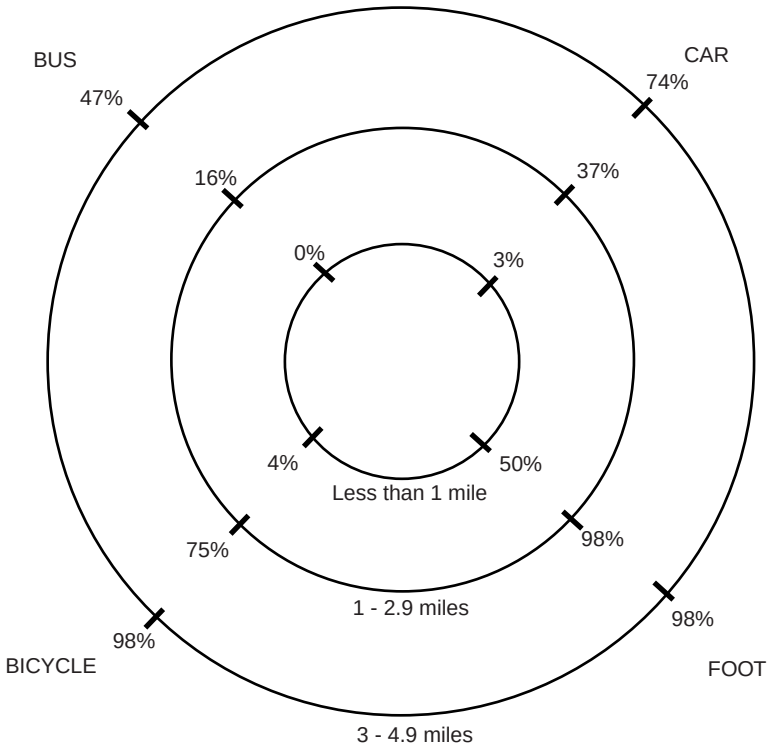

Figure 2 Catchment area for different modes on Anglia trains local services

5.1 Bike and car – cycling motorists

The cycling motorists were asked about the advantages of coming by car. These were considerable, and included the practicality of being able to take a family and bikes (see Plate 3), shorter journey times, and not having to cycle on dangerous roads with small children. Less important advantages were considered to be not having to cycle through built up areas, cost, the freedom of arrival and departure times, being able to cover long distances, and the availability of safe and plentiful car parking.

Plate 3 A family of four arrive at Rendlesham Forest, Tangham by car, bringing their bikes with them

Disadvantages of arriving by car mentioned by respondents were environmental, loading and unloading bikes and the consumption of petrol. None of them would have made the trip if their cars had not been available, suggesting that they had not considered options such as rail as a viable alternative.

The cycling motorists were asked what they thought would be the advantages of taking a bike on the train. Most of these advantages related to specific personal advantages such as cheaper, quicker and safer travel and avoiding the unreliability of public transport. Some emphasised the less tangible benefits of it being less hassle, more relaxing and easier than car travel. The final set of advantages related to the general societal benefits of reducing car usage and congestion. Although an extensive list of advantages, the revealed preference by this group suggests that none of these are sufficient to prevent the car from being the dominant choice.

There were 16 different disadvantages of using bikes on trains, the main one being cost, followed by the lack of destinations, insufficient cycle carriage capacity, the roads being too busy for cycling and the station being too far away.

The most important deterrent to using the train to get to a leisure cycling destination was the journey from the destination station to the start of the leisure cycle ride. This was mentioned as a factor which deterred almost every respondent, half of them finding it a very important factor. Not quite as many respondents were concerned about the journey from their house to the station. This suggests that the fear of cycling on unknown roads is greater than fear of cycling on roads near home. When asked about distances they would be willing to travel to the start of a leisure journey, most said they would be willing to cycle up to 3 miles from the destination station, and one third claimed they would cycle up to 5 miles.

The next most important obstacles to using trains, mentioned by the between one third and one half of cycling motorists, were the cost of train travel, the frequency of trains, and the inability to carry things. Other factors mentioned included the need to book ahead, the reliability, speed and punctuality of train travel, and the lack of guaranteed space for a family with three bikes.

5.2 Bike racks – cycling motorists

Nearly two thirds of cycling motorists had not heard about the Anglia Railways' bikes on trains initiative and none of them had used it. When they were given a (neutral) description, three quarters agreed that the bike racks would make them more likely to take a bike on the train. However, nearly all said they would probably or definitely not take their bikes on the train in the next six months. The few who said they might, thought it would be less than once a month.

At the end of the questionnaire, respondents were asked which factors would encourage them to combine cycling with the train. Just over half said a safe route from the train station to the leisure cycling area might encourage them on its own, and another quarter said that it might in conjunction with other measures. Suffolk County Council do, in fact, have plans for leisure cycle paths from stations, although as Davies et al (1997) points out, fear of traffic is a very complex issue. Around half said that more information on train services might make them combine cycling with the train more often, but only two said it definitely would.

6 Overall policy implications

The likelihood of a non-cyclist starting to cycle will depend upon the advantages to be gained from cycling, beliefs about how other people regard cyclists, and confidence in their ability to complete the journey safely and comfortably. The questionnaire therefore included a two-stage process which first measured the perceived importance of selected requirements for the bike rail combination, and secondly, asked to what extent the cycle racks help meet these needs.

Table 3 shows the results of this exercise. A numerical value has been assigned to the answers whereby negative numbers represent disagreement, from -5 = slightly disagree to -10 for strongly disagree. Positive numbers represent agreement, with +5 = slightly agree and +10 = strongly agree. The most important contributory factor will be one that people strongly agree is important, and which they also strongly agree has been increased by the provision of racks. Hence, multiplying the scores for the two answers gives an indication of what will be the greatest contribution of the cycle racks.

Table 3 Indicators of factors needed for increased cycling and the contribution of bike racks towards these needs

Factor	*The importance of this factor is (score out of 10)*	*The contribution of bike racks to this requirement is (score out of 10)*	*Total (product - out of 100)*
Rail operators take the needs of cyclists seriously	5.9	5.1	34
Other road users see cycling as a 'normal' form of transport	6.3	2.1	13

This method of questioning was used to tackle one of the issues identified by Davies et al (1997) as especially important in encouraging cycling, namely that it must be seen as a 'normal' activity. In many cases, cyclists are regarded by others (and sometimes by themselves) as members of a fringe group. Such attitudes are a barrier to cycling becoming an accepted means of transport.

What Table 3 suggests is that the need to be taken seriously by other road users is of more importance to respondents than the need to be taken seriously by rail operators. The provision of racks on its own does not help other users to see cycling as a normal form of transport. The racks do appear to demonstrate that rail operators themselves are concerned about the needs of cyclists.

The numerical re-coding of subjective data, though not using an accurate scale, also permits comparison of the answers to other questions, as shown in Table 4.

Table 4 Numerical presentation of agreement levels expressed

Statement	*Average score: (Very much agree=10 Very much disagree= -10)*
Bike racks make the carriage of bikes on trains less inconvenient for other passengers	4.43 (everyday cyclists) 1.88 (never cycle)
It is important that trains should have bike racks	6.19
It is important that stations should have secure parking	7.85

It can be seen that, compared with everyday cyclists, those who never cycle think less of the impact of bike racks on the convenience to other passengers. One explanation being that the everyday cyclists are over-sensitive about the inconvenience they think they cause. Table 4 also shows the provision of secure parking is considered the most important by all users. A total of 76% of all people strongly agreed with the statement that more secure parking should be provided.

7 Discussion

A key advantage of the bike train combination is that it can enable sustainable travel for journeys that are beyond the normal cycling distance, provided there is a station within 'cycleable' distance at both ends. The research suggests that this will be between 2.5 and 3.5 miles, but the concept of cycleable includes not just distance, but also an element of quality and safety of the route, and also the facilities available at the journey's end (Gardner & Ryley, 1997).

For those who already use a bike-rail combination, one of the advantages is that it offers 'less stress', has flexibility and is easier than car parking. Approximately one third of all respondents imagined that the specific advantage of taking a bike on the train, rather than leaving it at the station, would be the ability to travel away quickly, easily and independently for the final leg of the journey. The search for journey without 'hassle', however, clashes with the perceived disadvantage of bike racks, particularly during peak times, that is the awkwardness of getting the bike onto a crowded train. Similarly a key advantage of cycling, that of being environmentally considerate, clashes with being put in a position of feeling inconsiderate to other passengers in delaying the train while boarding and taking up seating space.

Cycling could have benefits for the onward journey without bike rack problems if a second bicycle is parked at the destination end. Judging by the extensive use made of cycle parking facilities at the London terminals, this is becoming an increasingly attractive option.

When asked what would make most difference to the likelihood of using a bike and rail combination, most people, especially current users, mentioned the need for safe parking at stations, preferably with weather protection. Both cycling and train journeys become considerably less comfortable in inclement weather conditions (unlike the car). Uncovered cycle parking leaves the bike open to corrosion and returning to a bike with a wet saddle is something that most cyclists would rather do without. Waiting (possibly already wet from the cycle ride) at stations which have no sheltered or heated waiting room will make the car seem an even more attractive option.

Many of the disadvantages of 'bike and ride' related to typical perceptions of rail travel generally eg unreliability, cost, overcrowding and infrequent services. Some disadvantages lie beyond the control of the rail operator, such as the amount and nature of the traffic on the roads leading to railway stations, and cooperation with highway authorities will be needed.

The rail operators are keen to attract leisure users. However, advantages such as the freedom to vary routes, set your own departure and (to some extent) arrival times are unique to the car and yet are so important to leisure users (Gardner, 1998). A particular problem is that the peak demand for leisure occurs when rail services are operating on off-peak service. The current capacity of the bike racks is also insufficient for a typical leisure group (e.g. two families) to guarantee being able to travel together.

8 Recommendations

The findings of this research support, or add weight to, the following recommendations for those hoping to increase the use of the train and bike combination.

1 Secure sheltered cycle parking and heated waiting facilities should be provided at all stations.

2 Access to the bike racks on trains should be made as effortless as possible by using an easy stacking system or having assistance with loading and unloading

3 A sufficient number of bike racks should be provided to minimise or remove the need to book ahead.

4 There should be a coherent network-wide policy on cycle carriage by rail in order to remove uncertainty over the entire journey.

5 The walk mode should not be overlooked, and measures to facilitate and encourage walking to stations should be provided.

6 Rail services convenient for a leisure route should be advertised where this will be seen by all possible users and not just current rail passengers.

Respondents themselves cited further recommendations such as waiving the current bike reservation fee, or giving cyclists discounts over other train passengers. Station access improvements suggested by users included designing or adapting stations so that staircases have wheel ramps, and having somewhere safe to leave their bikes whilst buying tickets and using the station facilities etc. Some cycling motorists would like safe routes from the station to leisure cycling facilities.

9 Conclusions

Combining bike with rail is one of very few sustainable mode combinations which enables journey times that can compete with the car. It will have an important role in any move towards integrated transport and reducing car dependency. This research suggests that although the bike racks themselves are not necessarily what is most needed, there is potential to increase the use of the bike rail combination. Secure, weather-protected cycle parking facilities at stations may be the most effective means of encouraging cycling and train use.

The results of these surveys suggest that the likely number of people who will use the bike racks is low. Main reasons for this are that cyclists need high (perhaps unrealistic) capacity in order to remove the need to reserve and pay in advance. Leisure users need a high frequency of trains which, in off peak times, will also be unrealistic.

The implementation of the new bike racks has, however, met with widespread support amongst the cyclists and the non-cycling train passengers alike. The project has acted as a stimulus for discussion and appears to have been a catalyst for other initiatives both locally and further afield. This high regard is reflected in the belief that the bike racks will make people more likely to cycle. In practice, this may occur as much because the bike racks add to the impression that cycling is a ‘normal’ activity, rather than because of the number of actual users of the racks themselves.

10 Acknowledgements

This work forms part of a DETR funded research programme for Phil Philippou of the CLT division who provided invaluable advice, Clive Morris of Anglia Railways provided essential assistance in gaining access to rail customers, and along with John French of Suffolk County Council, were the driving force in getting the racks funded. Peter Meades of Anglia Railways and the staff at Rendlesham Forest, Tangham are thanked for their help with the survey work. The authors would also like to thank David Davies at TRL for helpful advice.

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Appendix A: Questionnaire for cyclists at leisure destination arriving by car

Self completion questionnaire for cyclists at leisure destination who arrived by car.

The Transport Research Laboratory is carrying out research for the Department of the Environment, Transport and the Regions (DETR). Your views would be much appreciated and will help us find ways of improving transport conditions for other people in the United Kingdom.

Please circle the numbers next to your answer, or write in the space available, using any type of pen or pencil. This questionnaire should take between 5 and 10 minutes to complete.

SECTION A: YOUR JOURNEY HERE TODAY

A1. Approximately, how far did you drive to get here today?

.....miles

A2. What are the advantages of using a car for this journey? (PLEASE MENTION AS MANY FACTORS AS YOU CAN THINK OF)

.....
.....
.....

A3. What are the disadvantages of using a car for this journey? (PLEASE MENTION AS MANY FACTORS AS YOU CAN THINK OF)

.....
.....
.....

A4. Had your car not been available for your journey, how would you have got here?

(PLEASE TICK AS MANY AS APPLY)

cycled all the way	1
waited until a car was available	2
travelled by the train	3
not gone at all	4
other (please specify)	5

.....

A5. How far do you live from your nearest train station, and which station is it?

.....miles, (or please give minutes travelled with mode if distance unknown eg 20 minutes walk, or 5 minutes drive)
.....station

SECTION B: TRAVELLING BY BICYCLE

B1. How often do you cycle?

PLEASE TICK ONE ONLY

6-7 days a week	1
3-5 days a week	2
1-2 days a week	3
About once a month	4
Less than once a month	5
The first time	6

B2. When you use your bicycle, which are the most common types of journey purpose?

PLEASE TICK ALL THAT APPLY

Commuting (to or from work)	1
Business (in the course of work)	2
Education	3
Shopping	4
Leisure	5
Personal business	6

SECTION C: BIKES ON TRAINS

Anglia Railways has recently adapted its trains so that they can carry bicycles. Four bikes can be carried on single carriage trains and up to 6 bikes on double carriage trains. This costs £1 for both a single and return journey.

C1. Did you know about this new service? Yes 1 / No 2

IF NO GO TO C4

C2. If you already knew about this facility, how did you find out about it?

.....

C3. Have you ever taken your bike on this train service since the new racks were installed?

Yes 1 / No 2

IF YES, PLEASE GIVE DETAILS ABOUT YOUR OPINIONS OF THIS FACILITY OVERLEAF THEN GO TO QUESTION C6

C4. What do you think would be the advantages, if any, of putting your bike on the train? PLEASE LIST AS MANY AS YOU CAN THINK OF

.....
.....
.....

C5. What do you think would be the disadvantages, if any, of putting your bike on the train? PLEASE LIST AS MANY AS YOU CAN THINK OF

.....
.....
.....

C6. Do you think you will take your bike on an Anglia train in the next six months?

yes, once a week or more,	1
yes, once a month or more	2
yes, but less than once a month	3
probably not	4
definitely not	5

C7. Would any of the following encourage you to combine cycling with taking the train?

1 maybe on its own
2 maybe in conjunction with other factors
3 definitely on its own
4definitely with other factors

1. more info about the current train service	1	2	3	4
2. a safe, signposted route from the train station to the start of your leisure cycle ride	1	2	3	4
3. a more frequent train service	1	2	3	4
4. other (PLEASE SPECIFY)	1	2	3	4

.....

C8. How important are the following factors in preventing you from taking your bike on the train?

	not important	quite important	very important
1. journey from home to station	1	2	3
2. journey from station to start of cycle ride	1	2	3
3. frequency of trains	1	2	3
4. cost of travelling by train	1	2	3
5. difficulty in carrying things	1	2	3
6. others (PLEASE SPECIFY)			

.....

C9. How far would you be willing to cycle to
a) get from your house to the train station?

.....miles
.....(or minutes cycled if preferred)

b) get from the train station to the start of your cycle ride proper?

.....miles
.....(or minutes cycled if preferred)

C10. To what extent do you agree or disagree with the following statement?
PLEASE CIRCLE ONE OF THE FOLLOWING:

1 strongly agree, 2 agree, 3 neither, 4 disagree, 5 strongly disagree

Bike racks on the train.....					
a. make me more likely to bring a bicycle on train journeys.....	1	2	3	4	5
b. suggest that rail operators take cyclists more seriously.....	1	2	3	4	5
c. give non-cyclists a better impression of cycling.....	1	2	3	4	5
d. make the carriage of bikes less inconvenient to other passengers	1	2	3	4	5

C11. If you were to consider taking your bike on the train, how much of a problem would the following be for you?
PLEASE CIRCLE ONE OF THE FOLLOWING:

1 a serious problem, 2 a slight problem, 3 not a problem at all

a. reserving a place for your bike in advance	1	2	3
b. paying £1 (per ticket, single or return) to take your bike on the train	1	2	3
c. getting your bike onto the platform (eg up and down stairs)	1	2	3
d. lifting your bicycle on and off the train	1	2	3
e. storing it whilst on the train	1	2	3

C12. In order to make cycling more attractive to you, how important do you think it is that.
PLEASE CIRCLE ONE OF THE FOLLOWING

1 v important, 2 important, 3 neither, 4 unimportant, 5 v unimportant

a.train operators take the needs of cyclists seriously	1	2	3	4	5
b.other road users view cycling as normal	1	2	3	4	5
c.every train is fitted with bike racks	1	2	3	4	5
d.every station has secure, high quality cycle parking?	1	2	3	4	5

SECTION D: HOUSEHOLD AND PERSONAL

We need this data so we can ensure that we obtain a good representative view of all types of people. This information will be used only for research and will not be disclosed to any outside person or organisation.

D1. Does your household have the use of a car?

Yes (more than 1 car)	1
Yes (only one)	2
No	3

D2. Is that car usually available for this journey? Yes1 No2

D3. How many bicycles do you personally own? .....

D4. Please describe the bike(s) you own? (For example Mountain bike, Racer/tourer, Town bike, Hybrid, Shopper, BMX etc.

.....

D5. Does any other adult living in your household own a bike? Yes 1
No 2

D6. To which of these age categories do you belong?

CIRCLE ONE ONLY

Under 18	1
18-24	2
25-40	3
41-59	4
60+	5

D7. What sex are you ? Male 1 Female 2

D8. Which of these best describes your working status? (The next two questions use standard categories as used in many other studies).

employed full time	1
employed part time	2
not employed	3
retired	4
studying	5
voluntary worker	6
"housewife"	7

D9. Which of the descriptions on this card best describes the occupation of the person who is the chief wage earner in your household? (If retired, please circle what their occupation was before they retired)

Higher professional/Senior manager	1
Middle or junior manager/intermediate or technical professional	2
Skilled manual	3
Partly skilled manual	4
Unskilled manual	5
Other manual	6
Can't say	7

TRL would like to carry out some more in-depth research into your choice of transport mode. If you would you like to participate in this research (you will receive a free day rover ticket on Anglia Railways if you are selected for interview), please give your name and phone number.

Name:..... (Daytime or Evening:please indicate)

Phone number:.....

If you want to know more about the survey then please contact researchers Geoff Gardner or Neil Guthrie on telephone 01344-773131 or write your details in the space below.

PLEASE POST USING THE FREE ENVELOPE PROVIDED.
MANY THANKS FOR YOUR COOPERATION.

Appendix B: Questionnaire for train passengers

The Transport Research Laboratory is carrying out research for the Department of the Environment, Transport and the Regions (DETR). This has the permission of Anglia Railways but is independent of them and is not part of any sales promotion. Your views will help us find ways of improving transport arrangements for other passengers in the United Kingdom.

Please circle the numbers next to your answer, or write in the space available, using any type of pen or pencil. This questionnaire should take you no longer than 5 minutes to complete.

SECTION A: YOUR JOURNEY TODAY

A1. What is the main purpose of your journey today?

CIRCLE ONE ONLY

commuting (to or from work)	1
business (in the course of work)	2
education	3
shopping	4
leisure	5
personal business	6

A2. How did you travel from the start of your journey today to where you boarded the train?

CIRCLE AS MANY AS APPLY

car	1
bicycle	2
bus	3
foot	4
motorbike	5

other (please specify).....

A3. Approximately how far was this?

.....miles
.....(please give minutes travelled if you do not know the distance)

A4. Which stations are you travelling from and to?

from.....to.....

A5. How will you travel from the train station where you get off, to your destination?

CIRCLE AS MANY AS APPLY

car	1
bicycle	2
bus	3
foot	4
motorbike	5

other (specify).....

A6. Approximately how far will this be?

.....miles
.....(please give minutes travelled if distance unknown)

A7. Do you ever make any part of this journey using other forms of transport?

Yes	1
No	2

IF NO GO TO A9

A8. Why do you sometimes use other transport combinations for this journey?

.....

A9. What are the advantages of the transport types which you use for this journey? (PLEASE LIST AS MANY ADVANTAGES AS YOU CAN THINK OF)

.....
.....

A10. What are the disadvantages of the transport types which you use for your current journey? (PLEASE LIST AS MANY DISADVANTAGES AS YOU CAN THINK OF)

.....
.....

SECTION B: TRAVELLING BY BICYCLE

B1. How often do you make any journey by bicycle?

CIRCLE ONE ONLY

6-7 days a week	1
3-5 days a week	2
1-2 days a week	3
About once a month	4
Less than once a month	5
Never	6

IF NEVER GO TO B3

B2. What purposes do you mostly cycle for?

CIRCLE AS MANY AS APPLY

Commuting (to or from work)	1
Business (in the course of work)	2
Education	3
Shopping	4
Leisure	5
Personal business	6

We would like to know more about using trains and bicycles together.

B3.What do you think would encourage you to cycle to the train station (or cycle there more often if you already do)?
PLEASE LIST AS MANY THINGS AS YOU CAN THINK OF

.....
.....
.....

SECTION C: BIKES ON TRAINS

Anglia Railways has recently adapted its trains so that they can carry bicycles. Four bikes can be carried on single carriage trains and up to 6 bikes on double carriage trains. This costs £1 for both a single and return journey.

C1. Did you know about this new service? Yes 1
No 2

IF NO GO TO C4

C2. If you already knew about this facility, how did you find out about it?

1 newspaper
2 radio/tv
3 Anglia promotional leaflet/magazine
4 word of mouth
5 saw them
6 other (specify .....)
7 didn't know

C3. Have you ever taken a bike on this train service?

Yes 1
No 2

(IF YES, PLEASE TAKE THE TIME TO WRITE MORE DETAILS ABOUT YOUR OPINION OF THIS FACILITY ON REVERSE SIDE, THEN GO TO QUESTION C5)

C4. What do you think would be the advantages of putting a bike on the train?
(PLEASE LIST AS MANY THINGS AS YOU CAN THINK OF)

.....
.....
.....

C5. What do you think would be the disadvantages of putting a bike on the train?
(PLEASE LIST AS MANY THINGS AS YOU CAN THINK OF)

.....
.....
.....

C6. Do you think you will take a bike on a local Anglia train in the next six months?

yes, once a week or more, 1
yes, once a month or more 2
yes, but less than once a month 3
probably not 4
definitely not 5

C7. What would encourage you to take a bike on Anglia trains more often?
(PLEASE LIST AS MANY THINGS AS YOU CAN THINK OF)

.....
.....
.....

C8. To what extent do you agree or disagree with the following statement?
Please circle one of the following:

1 strongly agree, 2 agree, 3 neither 4 disagree 5 strongly disagree

Bike racks on the train.....					
a. make me more likely to bring a bicycle on train journeys.....	1	2	3	4	5
b. suggest that rail operators take cyclists more seriously.....	1	2	3	4	5
c. give non-cyclists a better impression of cycling.....	1	2	3	4	5
d. make the carriage of bikes less inconvenient to other passengers	1	2	3	4	5

C9. If you were to consider taking your bike on the train, how much of a problem would the following be for you?

1 a serious problem, 2 a slight problem, 3 not a problem at all

a. reserving a place for your bike and paying for its carriage	1	2	3
b. getting onto to the platform with your bicycle	1	2	3
c. lifting your bicycle on and off the train	1	2	3
d. storing it whilst on the train	1	2	3

C10. In order to make cycling more attractive to you, how important do you think it is that.....

1 v important, 2 important, 3 neither 4 unimportant, 5 v unimportant

a.train operators take the needs of cyclists seriously	1	2	3	4	5
b.other road users view cycling as normal	1	2	3	4	5
c.every train is fitted with bike racks	1	2	3	4	5
d.every station has secure, high quality cycle parking?	1	2	3	4	5

C11. Are there any other comments you have on travelling by train and or bicycle?

Continue overleaf or on a separate sheet if necessary.

SECTION D: HOUSEHOLD AND PERSONAL

We need this data so we can ensure we obtain a good representative view of all types of people. This information will be used only for research and will not be disclosed to any outside person or organisation.

D1. Does your household have the use of a car?

Yes (more than one) 1
Yes (one) 2
No 3

D2. Is that car usually available for this journey? Yes1 No2

D3. How many bicycles do you personally own, if any? .....

GO TO D5 IF NO BIKES OWNED

D4. Please describe the bike(s) you own? (For example Mountain bike (thick tyres) Racer/tourer (dropped handlebars) Town bike/hybrid (mudguards) Shopper etc.

.....

D5. Does any other adult living in your household own a bike?

Yes 1
No 2
Not applicable 3

D6. To which of these age categories do you belong?

CIRCLE ONE ONLY

Under 18 1
18-24 2
25-40 3
41-59 4
60+ 5

D7. What sex are you? Male 1 Female 2

D8. Which of these best describes your working status? (The next two questions use standard categories as used in many other studies).

employed full time 1
employed part time 2
not employed 3
retired 4
studying 5
voluntary worker 6
"housewife" 7

D9. Which of the descriptions on this card best describes the occupation of the person who is the chief wage earner in your household? (If retired, please circle what their occupation was before they retired).

Higher professional/Senior manager 1
Middle or junior manager/intermediate or technical professional 2
Skilled manual 3
Partly skilled manual 4
Unskilled manual 5
Other manual 6
Can't say 7

If you want to know more about the survey then please contact researchers Geoff Gardner or Neil Guthrie on telephone 01344-773131 or write your details in the space below

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Abstract

This report documents the results of a survey of potential users of bicycle racks on Anglia Railways trains. The racks were provided under the government's Cycle Challenge initiative. The main advantages and disadvantages are discussed, and recommendations made for those promoting the combination of bike and rail. The importance of walking is also noted and the concept of suitable cycling and walking distances discussed. The report concludes that the cycle racks, while not carrying large numbers of bicycles, can be considered successful for the interest they have attracted and their promotion of cycling as a mainstream activity.

Related publications

TRL369 *New cycle owners: expectations and experiences* by D G Davies and E Hartley. 1999 (price £25 code E)

TRL347 *Transport implications of leisure cycling* by G Gardner. 1998 (price £25 code E)

TRL346 *Cycling for a healthier nation* by L M Pearce, A L Davis, H D Crombie and H N Boyd. 1998 (price £35 code J)

TRL309 *Trip end facilities for cyclists* by G Gardner and T Ryley. 1997 (price £35 code E)

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