

Bicycle Ownership and Use in Amsterdam

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A study was undertaken to provide a better understanding of the constraints that hinder bicycle ownership and use and to propose measures and incentives that may help to promote the use of bicycles. In 1991, 3,000 inhabitants of the Amsterdam conurbation were interviewed about their ownership and use of a bicycle. Some of the main results of the survey are as follows. A total of 77 percent of the people interviewed own a bicycle. The main reasons for not owning one are hazardous traffic conditions, bicycle theft, and the availability of other means of transport. A total of 44 percent of all inhabitants use a bicycle on a regular basis; 33 percent own a bicycle but rarely or never use it. The main reasons for not using a bicycle are high risk of bicycle theft, long distances, absence of luggage-carrying facilities, and a lack of comfort.

Since the 1950s there has been a tremendous increase in people's mobility. This is mainly because of a greater mobility by car. High mileage gives rise to many negative effects. Harmful exhaust emissions create environmental problems, and parked and moving cars cause congested streets. In various government reports (1-3) and the *Draft Traffic and Transport Plan* (4), the question of a "sustainable society" is discussed as a criterion for the policy to be implemented. Environmental problems caused by traffic and transport must be tackled. The bicycle can play a more significant role in this policy.

Since 1960 the number of trips by bicycle in Amsterdam has halved every 15 years [from 300,000 to 70,000 in the evening rush hour (4)]. The reasons for this decrease include the enormous rise in the number of people who own a car and the constant increase in the distance between home and workplace. This development does not mean that the role of the bicycle in the future should be dismissed. In a city environment such as Amsterdam, a bicycle can offer a good alternative means of transport, especially to a car, mainly because of its speed and excellent ability to penetrate traffic.

In a report by the Physical Planning Department, or DRO (5), the possible increase in bicycle use in Amsterdam was estimated on the basis of objective constraints. With the constraints used (bicycle ownership, distance, and age), it was not possible to indicate the true scale of the possible increase in bicycle use. This led to DRO being commissioned to carry out this follow-up study.

AIM

The aim of the follow-up study is to provide a better understanding of the constraints that hinder the use of bicycles within the Amsterdam conurbation and the measures that may promote their use. This makes a positive contribution to the traffic and transport policy as specified previously (1-4,6).

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ORGANIZATION OF STUDY

The starting point for determining the constraints that hinder bicycle use is the individual. The constraints include the motive for traveling by bicycle (very much determined by the activity routine of the individual), the place of residence, and the possession or otherwise of a bicycle, a car, or a public transport season ticket. Once the constraints have been established, judgments can be made about the package of measures that can be implemented to promote bicycle ownership and use.

To gain a better understanding of the constraints identified, a telephone survey was conducted of 3,000 inhabitants aged 12 and over of the Amsterdam conurbation (the conurbation includes Amsterdam, Amstelveen, Badhoevedorp, Diemen, Duivendrecht, and Ouderkerk on the Amstel). The survey was divided into the following:

- Questions about bicycle ownership;
- Questions about bicycle use broken down per motive for traveling;
- Questions about proposed measures to promote bicycle use;
- Questions about the attitude of the person interviewed toward bicycles; and
- General background questions (age, income, composition of the household, main activities, and postal code of the place of residence).

The survey was conducted between October and December 1991 by the Amsterdam Bureau of Research and Statistics. The results of the survey were scaled up for the whole conurbation.

The order of this paper is based on the order of the questions in the survey. The next section describes bicycle ownership within the conurbation, whereas the following section looks at bicycle use. Then the reasons for using a bicycle or not are described and broken down per motive. A variety of motives for traveling are identified elsewhere (7). This paper will concentrate on the home-to-work motive; the most notable results of the other motives will be briefly presented. Besides the home-work motive, the following motives for traveling have been identified: home-school or study, home-shopping, and home-leisure.

A more detailed account can be found in the main report (7).

BICYCLE OWNERSHIP

The conurbation has been divided into four areas to provide a good description of the differences in bicycle ownership in the various parts of the conurbation (Figure 1). Each of these areas comprises a number of districts that are based on the existing living conditions and the period in which the areas were built. The areas are the city center (District A), the prewar area (Districts C through M), the outskirts (Districts N through T), and the neigh-

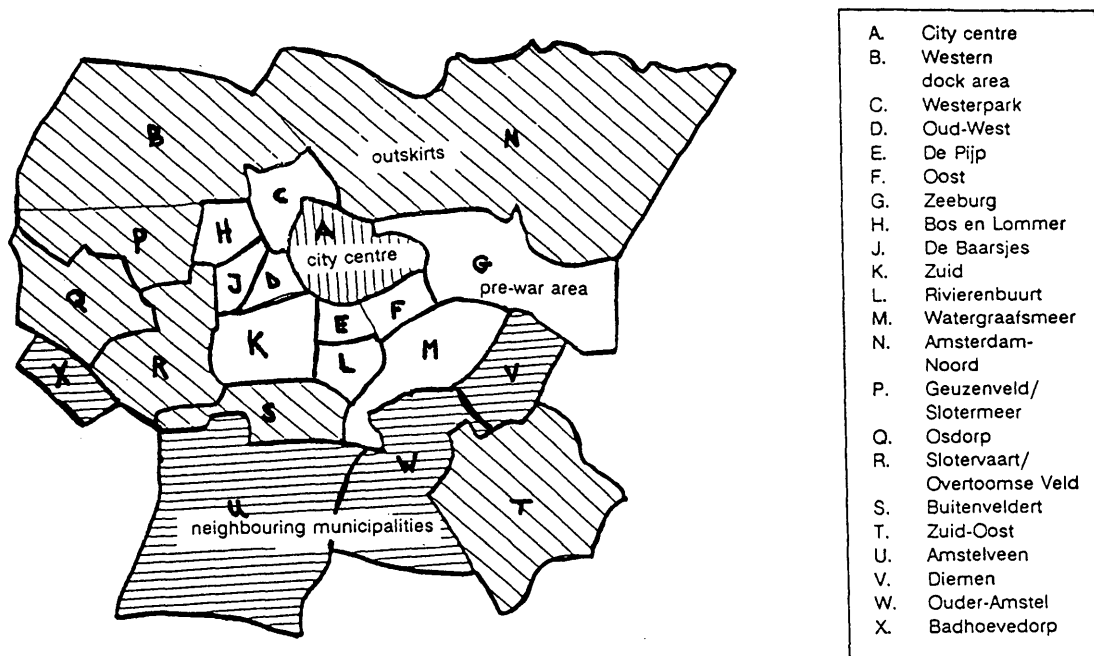


FIGURE 1 Division of conurbation into areas

boring municipalities (Amstelveen, Diemen, Ouder Amstel, and Badhoevedorp).

Description

About three-quarters of the inhabitants of the conurbation own a bicycle. However, the percentage of ownership varies somewhat if the different areas are considered individually. A look at the four areas (Table 1) identified will show the following about bicycle ownership: that bicycle ownership in the districts Zeeburg, Bos en Lommer, and Rivierenbuurt is low compared with the average in the prewar districts. The survey indicates that bicycle ownership increases in line with the standard of education, income, car ownership, and possession of a driving license. The older the respondent, the less likely he or she is to own a bicycle.

Reasons for Not Owning a Bicycle

A significant proportion (23 percent) of the inhabitants of the conurbation does not own a bicycle. To be able to indicate whether

this proportion can be reduced, the reasons for not owning a bicycle were explored. As part of the survey these people were presented with a number of possible reasons for not owning a bicycle. At the same time they were asked to indicate the two main reasons (of all the reasons presented) for not owning a bicycle. The following reasons were presented to the respondents:

- A. I cannot ride a bicycle.
- B. I do not like cycling.
- C. I think the risk of theft is too high where I live.
- D. I think the risk of theft is too high in general.
- E. I do not need a bicycle.
- F. I think it is hazardous to cycle in traffic.
- G. A bicycle is too expensive.
- H. I am not allowed to cycle for health reasons.
- I. Other reason (including do not know/no opinion).

The main reasons for not owning a bicycle are represented in Figure 2. The percentages indicate how often a particular reason was given as one of the main reasons. The total percentage is 100 percent. If 5 percent is indicated for one particular reason (e.g., health), this means that health was given by 10 percent of people as being one of the two main reasons.

The main reason for not owning a bicycle appears to be that it is hazardous to cycle in traffic (Reason F). Theft (Reasons C and D), not needing a bicycle (Reason E), and reasons other than the ones given (Reason I) also appear to play a major role. The study reveals that bicycle theft has reached alarming proportions. Every year 40 percent of all bicycles in the Amsterdam conurbation are stolen, that is, about 256,000 bicycles annually.

There are, however, fairly large differences in the reasons given for not owning a bicycle where the place of residence of the respondents is taken into consideration. To illustrate this point, by far the main reason given by people living in Amsterdam city

TABLE 1 Bicycle Ownership per Area

	Bicycle ownership
city centre	82%
pre-war districts	73%
outskirts	77%
neighbouring municipalities	86%
conurbation	77%

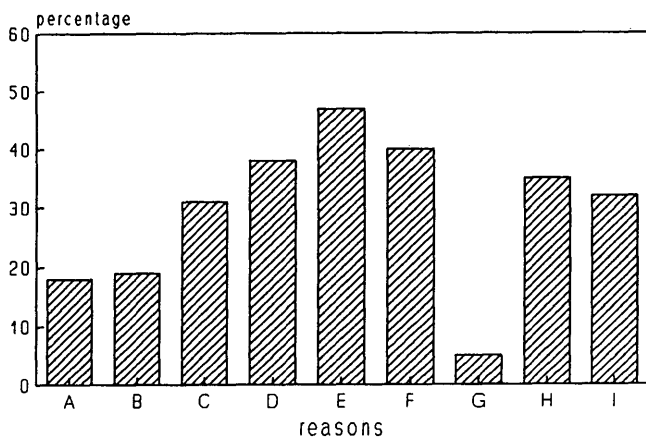


FIGURE 2 Reasons for not owning a bicycle.

center and in the neighboring municipalities is that they do not need a bicycle. In the city center and in the prewar districts, theft from the home environment is much more common than in the neighboring municipalities and on the outskirts. Theft in general (Reason D) is considered much more significant in the two outer areas than theft from the home environment (Reason C), whereas in the inner areas the converse is true.

BICYCLE USE

The most important part of the survey is the questions about whether people use their bicycles. In this part of the survey, people were asked which means of transport they used. In addition, bicycle owners were asked their reasons for not choosing to use their bicycle.

The inhabitants of the conurbation are divided into two groups: a group of cyclists and a group of noncyclists. The cyclists all own a bicycle and use it for at least one motive. The noncyclists never cycle no matter what the motive. The fact that people are classified as noncyclists does not mean that they do not own a bicycle; many of them do but never use it. Just over half (56 percent) of the inhabitants of the conurbation are classified as noncyclists and hence never cycle. The others (44 percent) do cycle. The previous section explored bicycle ownership and discussed the distribution of bicycle ownership over the different areas. The distribution of bicycle use over the different areas will now be examined. Table 2 indicates the proportions of the inhabitants of the Amsterdam conurbation who actually use a bicycle. To encourage more people to cycle, those people who do not cycle

TABLE 2 Cyclists and Noncyclists per Area

	cyclists	non-cyclists	
		with bicycle	without bicycle
city centre	63%	19%	18%
pre-war districts	48%	25%	27%
outskirts	34%	43%	23%
neighbouring municipalities	43%	43%	14%
conurbation	44%	33%	23%

TABLE 3 Absolute Numbers of Noncyclists per Area

	all	non-cyclists	
		with bicycle	without bicycle
city centre	26,500	13,500	13,000
pre-war districts	155,000	74,000	81,000
outskirts	164,500	106,000	58,500
neighbouring municipalities	56,500	42,500	14,000
conurbation	402,500	236,000	166,500

must be considered, and these are shown in the table as well. A distinction is made between cyclists and noncyclists. Table 2 also shows that although the proportion of bicycle use is highest in the city center, 19 percent of the inhabitants there own a bicycle but never use it. On the outskirts and in the neighboring municipalities, 43 percent of the population own a bicycle but do not use it. Bicycle use in the neighboring municipalities is, nevertheless, markedly higher than it is in the outskirts. The proportion of people who do not own a bicycle is highest in the prewar districts, as Table 1 has already indicated. The proportion of noncyclists is highest in the Bos en Lommer district where 72 percent of the population do not cycle. In absolute terms, the numbers of noncyclists are distributed over the areas as shown in Table 3. This table indicates that many people do not cycle in the prewar districts and on the outskirts. Implementation of the right measures might show that the highest absolute growth in bicycle use can be achieved there. It seems easier to encourage people who already own a bicycle to use it than to make people go out and buy a bicycle. The outskirts would then have a tremendous growth potential. Two-thirds of noncyclists there already own a bicycle.

Reasons for Using a Bicycle

If the respondents indicated that they made a particular trip by bicycle, they were asked to give a reason for this. This was done in the same way as with the reasons for not owning a bicycle. A number of reasons were given, and the respondent was asked to indicate whether the reason played no role, played a role at all, or even played a major role in using a bicycle. The following reasons were given:

- It is faster by bicycle.
- With a bicycle you do not have to queue in traffic.
- With a bicycle you do not have any parking problems.
- It is better for your health to use a bicycle.
- It is good for the environment.
- It is cheaper.
- With a bicycle you do not have to depend on public transport.
- I only own a bicycle.
- Other reason.

With regard to the "leisure" motive, another reason was given:

- If I use my bicycle I can drink alcohol.

As was the case when indicating the reasons for not owning a bicycle, the respondents were asked to name the two main reasons for using a bicycle (Figure 3). In most cases the main reason is that a bicycle is faster (Reason a) or that you do not have to depend on public transport if you use a bicycle (Reason g).

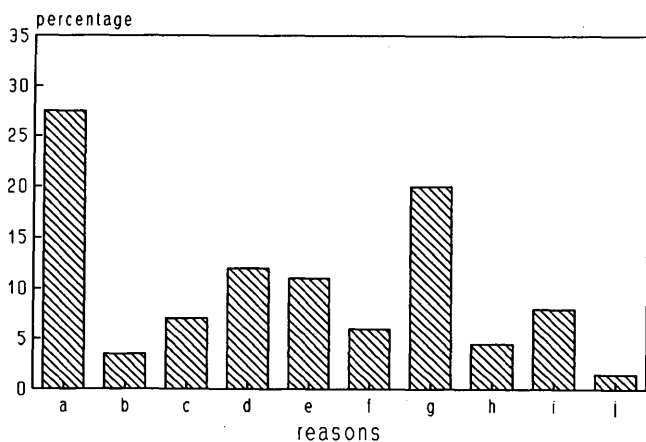


FIGURE 3 Main reasons for using a bicycle.

In the city center the speed factor (Reason a) and not having to depend on public transport (Reason g) emerge as the two main reasons, with the first reason playing a much more important role than the second. Of the four areas, the lack of parking problems (Reason c) is mentioned most often in the city center. This might also explain why a bicycle is faster than a car in the city center since the traveling time by car includes the time needed to find a parking place. On the outskirts and in the neighboring municipalities the speed factor (Reason a) and not having to depend on public transport (Reason g) are also mentioned but much less often than in the other areas. The reason given that cycling is good for your health (Reason d) also plays an important role in the two outer areas.

Reasons for Not Using a Bicycle

One-third of inhabitants own a bicycle but never use it. If a particular trip was not made by bicycle, the respondents were asked why the bicycle was not used. A number of reasons were given for each motive for traveling and the respondents had to indicate whether the reason played no role, a significant role, or a major role.

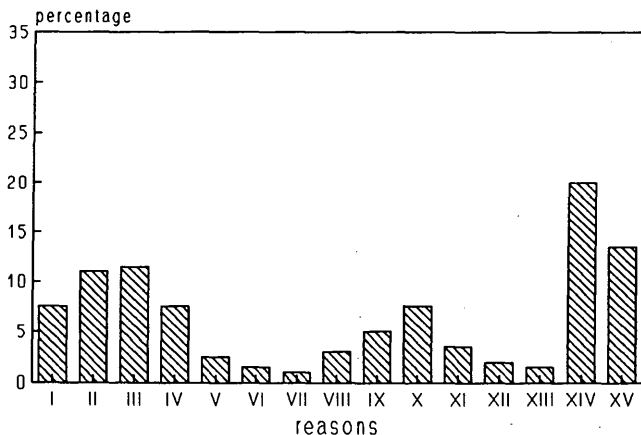


FIGURE 4 Main reasons for not using a bicycle.

TABLE 4 Choice of Means of Transport per Motive for Traveling (Bicycle Owners)

	home-work	home-study	shopping	leisure
bicycle	38%	58%	25%	25%
car	36%	4%	30%	41%
public transport	18%	33%	21%	19%
on foot	5%	4%	22%	11%

The following reasons were given:

- I. It is slower by bicycle.
- II. A bicycle is uncomfortable.
- III. I cannot carry any bags on a bicycle.
- IV. There is a risk that the bicycle will be stolen from the destination.
- V. It is dangerous or unsafe on a bicycle.
- VI. The surface of the cycling route is poor.
- VII. The cycling route is bad; I would have to make a detour.
- VIII. The cycling route is socially unsafe (e.g., for women cycling alone).
- IX. With the car/public transport I can combine various rides.
- X. With the car/public transport I can travel with other people.
- XI. I have a car/public transport season ticket.
- XII. I can travel with someone by car.
- XIII. I think it is nicer.
- XIV. It is too far to cycle.
- XV. Other reason.

Reasons XII and XIII were put only to people who traveled by car and not to those people who used public transport. Figure 4 indicates the main reasons for not using a bicycle. The main reason mentioned is that the distance is too far (Reason XIV). However, no major differences are noted if a distinction is made in the place where people live. Furthermore, the absence of luggage-carrying facilities on a bicycle (Reason III), the lack of comfort (Reason II), and the risk of bicycle theft (Reason IV) are major factors in the decision not to use a bicycle. Hazardous traffic conditions (Reason V) and the quality of the route (in terms of the surface and the need to make a detour) (Reasons VI and VII) are of minor importance. One notable aspect is that the possession of a public transport season ticket is a more likely reason for not cycling than is having access to a car.

BICYCLE USE PER MOTIVE FOR TRAVELING

The survey asked a number of questions per motive. Four motives were examined; home-work, home-school, shopping, and leisure. In the case of the home-work and home-study motives, respondents were asked how they normally traveled. With regard to the shopping and leisure motives, they were asked about the last time they made a trip of this kind. Respondents were asked about the reasons for cycling, or otherwise, for each motive. In addition, a few questions specific to particular motives were asked.

Table 4 shows that there are substantial differences per motive with regard to the bicycle percentages in the modal split. Possible reasons for this are discussed. In general it can be stated that, independent of the motive, the distance to be traveled is given as the main reason for not cycling.

TABLE 5 Reimbursement of Traveling Expenses and Choice of Means of Transport by Employed People

	km allowance	only public transport costs reimbursed if used	public transport season ticket	none
car	57%	24%	25%	30%
public transport	19%	44%	37%	10%
bicycle	18%	27%	31%	48%
on foot	1%	2%	1%	7%
% employed people reimbursed	37%	26%	15%	22%

Home-Work Motive

Some 350,000 inhabitants of the conurbation, aged 12 and over, state in the survey that they are in paid employment or do voluntary work. This is about 50 percent of all of the inhabitants of the conurbation aged 12 and over. With regard to the home-work motive, besides the distance involved, comfort (or more accurately the lack of it), speed, and the lack of luggage-carrying facilities are given as reasons for not cycling to work.

The survey asked a few questions specific to this motive concerning such things as reimbursement of traveling expenses, parking facilities, and storage facilities for bicycles. These questions were put only to bicycle owners. The effect of these factors on bicycle use will be examined. Whether or not traveling expenses are reimbursed has a major effect on bicycle use. If a traveling allowance is provided, bicycle use drops sharply.

It can be seen in Table 5 that a kilometer allowance encourages people to travel by car. If public transport costs are reimbursed or a season ticket is provided, car use appears to decrease. If traveling expenses are not reimbursed, car and bicycle use is higher. To make a large number of people travel by bicycle, therefore, no traveling expenses should be reimbursed.

As expected, car parking facilities affect the means of transport chosen (Table 6). It appears that the poorer the parking facilities are, the fewer the number of people who drive to work. The parking facilities for employed people are as follows: 50 percent can park their car at no charge on the company's premises; 22 percent also have adequate free parking facilities, albeit on the public highway; 28 percent have inadequate free parking facilities at their workplace. This last group can be divided into two: 6 percent do have inadequate free parking facilities but can pay to park their car; for 22 percent parking facilities are totally inadequate, paid or otherwise.

If parking facilities are poor, the use of bicycles and public transport increases and the use of cars decreases. With distances shorter than 5.5 km, bicycle use in particular increases, whereas

with distances longer than 5.5 km, the use of public transport increases. However, even where long distances are involved, almost 25 percent of people travel by bicycle if parking facilities are totally inadequate.

The different storage facilities for bicycles do not have the expected effect on the modal split. The survey reveals that in places where good storage facilities are available, bicycle use is low, and vice versa. However, it is often companies in areas on the outskirts of the conurbation that provide good storage facilities. The distance to be cycled is therefore too far in many cases to make the bicycle a viable alternative. Moreover, these areas can be reached easily by car. With regard to the converse effect, the city center and the prewar districts in particular have poor storage facilities for bicycles. The distance to be cycled is reasonable in these areas, but the risk of theft hinders bicycle use.

Other Motives for Traveling

Ownership and use of a bicycle by students and school pupils (11 percent of the people interviewed were school pupils or students) are higher than average. Bicycles are owned by 91 percent, and the bicycle accounts for 58 percent in the modal split (see Table 4). The main reasons for not cycling therefore apply to a limited group.

Pupils and students indicate that the possession of a public transport season ticket is a reason not to cycle to school or place of study. Thanks to the Student Grants Act, 70 percent of people who travel for this motive have a student's season ticket. This group of travelers accounts for a high proportion of public transport use, which is at the expense of bicycle use in particular (because car use already is particularly low among this group).

Shopping can be roughly split into two categories: daily shopping and occasional shopping (e.g., to buy clothes, gifts, books, and recordings). In the survey, people were asked about shopping trips for occasional purchases.

TABLE 6 Parking Facilities at Workplace and Choice of Means of Transport by Employed People

	adequate		inadequate	
	own premises	public highway	adequate paid facilities	totally inadequate facilities
car	49%	42%	22%	15%
public transport	18%	12%	20%	23%
bicycle	27%	35%	48%	50%
on foot	3%	6%	4%	7%

Shoppers choose not to cycle because of the problems associated with carrying bags on a bicycle. In addition, lack of comfort, the wish to travel with several people, and the risk of shopping area theft all contribute to a choice of transport other than the bicycle.

Another factor that affects the choice of means of transport is car parking facilities (as with the home-work motive). The survey revealed that on the outskirts and in the neighboring municipalities many people travel by car, even when the storage facilities for bicycles are just as good and people live less than 5.5 km from the shopping area. This is largely explained by the fact that the shopping areas here are more accessible by car as a result of them being opened up and having more-than-adequate parking facilities. The poorer the parking facilities (city center, prewar districts), the fewer the number of people who travel by car and the greater the use of bicycles or public transport. The survey asked what people last did in their leisure time. A number of options were presented: playing a sport, going out (theater, cinema, restaurant), visiting a museum, walking, cycling, or visiting friends or family. The social nature of trips for pleasure means that traveling with more than one person is an important reason for not cycling.

CONCLUSION

Three out of four inhabitants of the Amsterdam conurbation aged 12 and over have a bicycle. It follows that one out of four does not. Why not? The main reason given is hazardous traffic conditions. In addition, people feel that they do not need a bicycle or that the risk of theft is too high.

Only 57 percent of all bicycle owners actually use their bicycles. The main reasons for using a bicycle are the fact that it is faster to cycle, one is not dependent on public transport, it is good for one's health, and there are fewer (car) parking problems.

One-third of inhabitants own a bicycle but never use it. Furthermore, those bicycle owners who do use their bicycles do not use them for every motive mentioned. The main reason given for not using a bicycle is that the distance to be traveled is too far.

With regard to the home-work motive, besides the distance involved, comfort (or the lack of it), speed, and the absence of luggage-carrying facilities are given as reasons for not cycling to work. The survey also revealed that in the case of the home-work motive, fewer people than average choose to travel by bicycle, whereas bicycle ownership is higher than average.

Restrictions on the accessibility to a destination by car will positively affect the choice to travel by bicycle. For pupils and students, the possession of a public transport season ticket, in addition to the distance involved, is the reason for not cycling to school or university.

Like commuters, shoppers attribute their choice not to cycle to the absence of luggage-carrying facilities and the lack of comfort.

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