# EMPIRICAL ANALYSIS ON THE TRAFFIC BEHAVIOR OF VISITORS IN SCENIC AREA TO MAKE PROGRAMS FOR EFFICIENT USE OF PARKING FACILITIES

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abstract : Measures of the holiday traffic and the road traffic in scenic area are taken up as problems to be discussed in the Road Council. Because the restriction concerning the environment is severe, especially, the maintenance of the parking lots is difficult in the scenic area with excellent natural environment. The purpose of this study is to clarify the characteristic on the traffic behavior of visitors by the investigation in order to propose the idea of the strategy to use the parking lot effectively in the scenic area with many natural resources such as the National Park.

## 1. INTRODUCTION

The amount of total generation of sightseeing with staying in 1992 is about 175,000,000 person−trips in Japan according to the estimate of Prime Minister's Office. If sightseeing with other purpose is included, it becomes 204,000,000 person−trips. In addition, the forecast is set up that it will increases to 1.4 times of the present value 10 years later.

The rate to use the private car keeps being occupied 44% in sightseeing now and still increase year by year. Measures of the holiday traffic and the road traffic in scenic area are taken up, from such situations, as problems to be discussed in the Road Council.

Because the restriction concerning not only the allowance of land and the capital but also geographical features is severe, the parking lot cannot be equipped enough in many scenic area. Especially, because the restriction concerning the environment is severe, the maintenance of the parking lots is difficult in the scenic area with excellent natural environment. There are a lot of cases where this causes the traffic congestion. Then, the purpose of this study is to clarify the characteristic on the traffic behavior of visitors by the investigation in order to propose the idea of the strategy to use the parking lot effectively in the scenic area with many natural resources such as National Parks.

The study on the parking lot policy has been actively advanced in Japan in the latter half of 1980's. They are researches to focus the shopping traffic in the city. The parking lot was added to the factor of the model by which the destination of shopping

was selected and the policy concerning the parking lot was examined by using it as a strategy of the activation of the town center. Adopting the disaggregate model, they clarify characteristics of the behavior to select the parking lot and estimate effects of the policy. In 1990's they advanced studies concerning a short−term policy to use the parking lot effectively in the town center. They examine the methodology to estimate policies on the charge, the system of the guide to the parking lot and the management of traffic etc.

These policies are thought to be effective in the scenic area. However, it is a fact that studies to target the scenic area has not been progressed, yet. The sightseeing traffic has characteristics different from the general traffic. It is necessary to match the parking lot policy to them in the scenic area. Then, in Oku−nikko region, the questionnaire for visitors is executed in order to clarify characteristics of the traffic behavior. The idea of the policy to use the parking lot effectively in the scenic area is proposed based on the result.

## 2. ZONING IN SCENIC REGION AND RANGE OF THE POLICY CONCERNING PARKING LOTS

### 2.1 ZONING IN SCENIC REGION

The area where the parking lot policy should be implemented unitedly is defined as the scenic region. Moreover, the area where the parking lot is selected, in the stage when visitors decide the sightseeing object to inspect, is defined as the sightseeing block. These areas are usually decided from the following view points.

Scenic region: It is recognized as a destination in the sightseeing travel on a day. It is a range recognized as the area with an united theme. In addition, in it, the change of traffic flow appears according to the parking lot policy because the sightseeing object is selected in the same region.

Sightseeing block: The scenic region is composed of sightseeing blocks and it is a sphere to be able to go round on foot and to include some sightseeing objects. It is recognized as a minimum unit of the scenic area.

### 2.2 RANGE OF THE POLICY TO USE THE PARKING LOT EFFECTIVELY

The parking lot in the scenic area is divided into the following two types. One is a parking lot which all people can use. The other is a parking lot which only people who visit specific facilities can use. In the scenic area located in a natural park, there are many cases that the former is managed by the local public group. It is the object of our discuss. We examine the policy concerning the charge and the system of the guide to the parking lot in this research.

### 2.3 OUTLINE OF THE OBJECT REGION

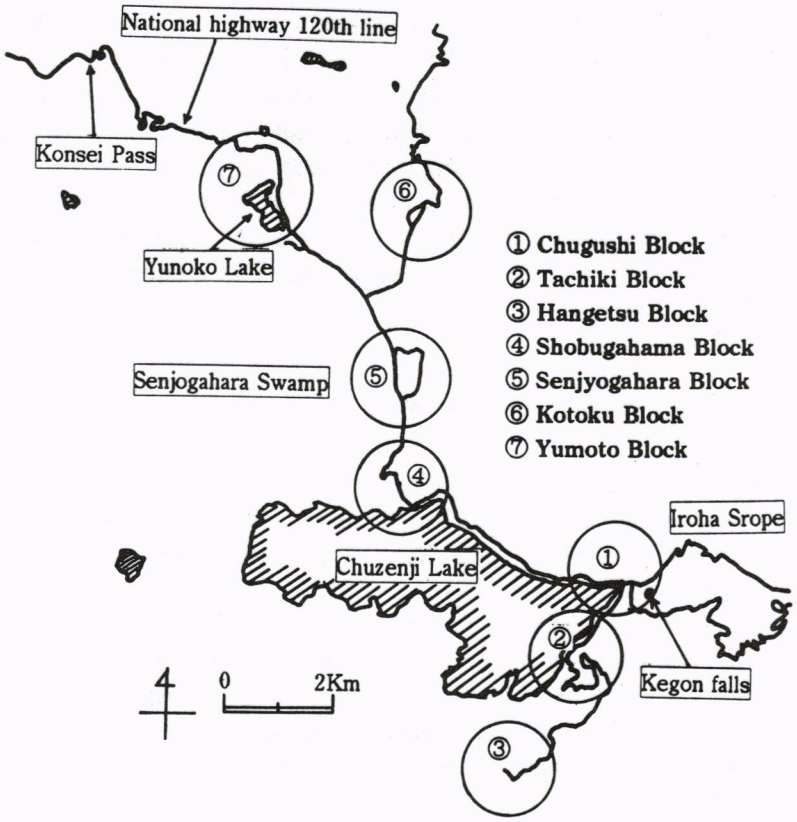


FIGURE 1. ZOHNING OF OBJECT REGION

TABLE 1. CAPACITY OF PARKING LOT ACCORDING TO BLOCK

| Type / Block | Public parking lots | | Private parking lots | | Total | | Conversion into a Small sized car |
|---|---|---|---|---|---|---|---|
| | Ordinary car | Small sized car | Ordinary car | Small sized car | Ordinary car | Small sized car | |
| Tyugusi | 83 | 438 | 50 | 211 | 133 | 649 | 915 |
| Tachiki | 30 | 200 | 0 | 80 | 30 | 280 | 340 |
| Hangetsu | 0 | 200 | 0 | 0 | 0 | 200 | 200 |
| Shobugaha | 13 | 98 | 6 | 120 | 19 | 218 | 256 |
| Senjyogaha | 0 | 335 | 7 | 109 | 7 | 444 | 458 |
| Kotoku | 21 | 45 | 0 | 20 | 21 | 65 | 107 |
| Yumoto | 20 | 460 | 15 | 220 | 35 | 680 | 750 |
| Total | 167 | 1776 | 78 | 760 | 245 | 2536 | 3026 |

Oku−nikko region is specified as the Special Region in the Nikko−National Park. It is a scenic region which has many excellent natural resources and a typical scenic region where a natural environent is a theme. It is thought that it is not preferable to construct more parking lots from the viewpoint of the restriction of the environment. Various policies are examined in order to become the model of the scenic region which harmonizes with natural environment. It is an area of about 100km $^2$ . National

Highway 120th runs through it in the direction from the east to the west. It is composed of seven sightseeing blocks shown in Figure 1. Each block is the scenic area of the sphere on foot which has the sightseeing resource with the defferent characteristic. It is Table 1 to show the capacity of the parking facilities of each block. There are about 3026 parking lots. They are composed of 916 exclusive parking lots and 2110 public parking lots. Almost part of public parking lots is free. The capacity of accommodations is about 6000 beds in the region including the hotel, the inn, the dormitory, and the campground, etc. The number of visitors is about 8,000,000 persons in a year.

## 3. THE POLICY OF TRAFFIC SURVEYS

It is thought that the pattern of visitors' reaction to the parking policy is very different depending on characteristics of them and the situation of the scenic region. Following points is enumerated as a characteristic of the sightseeing traffic compared with the shopping traffic.

① The kind of the recreation activity is various. The traffic behavior is very different in it. In the scenic area where nature is assumed to be a theme, activities done by visitors are divided into the recreation in the outdoor and activities of the tour type. the former is composed of many kinds of activities, namely hiking, fishing, camping and so on. Therefore, it is necessary to clarify the characteristic of the traffic behavior at each activity.

② In the scenic area, it is enumerated that the amount of traffic changes largely in each season. It is thought that traffic congestion largely influences the traffic behavior of visitors. Therefore, it is necessary to implement the comparison analysis on it at some different levels of traffic congestion.

③ Because the effectiveness of the parking policy largely depends on two above mentioned variables, it is necessary to clarify the relation between the traffic behavior and them. In addition, it is especially important that the analysis is implemented in order to make the period clear when the policy functions effectively.

④ The traffic behavior of visitors can be divided into three steps of the selections concerning the destination among blocks, the parking lot in the block, and the the parking time.

## 4. OUTLINE OF TRAFFIC SURVEYS

### 4.1 THE CHARACTERISTIC OF INVESTIGATING DAYS

The level of the traffic congestion was divided into the following three levels. To clarify the change in the traffic behavior by them, the investigating day was set at each congestion level.

Monday of August 15, 1993 ··· Situation crowded most
Tuesday of August 16 ··· Average situation on congestion day
Thursday of October 20 ··· Situation that congestion starts

## 4.2 CONTENTS OF SURVEYS

① Measurement of the number of cars to use a parking lot
The number of cars in a typical public parking lot at each block is measured.
② Questionnaire survey concerning traffic behavior
The questionnaire of the content shown in Table 2 is executed and 1052 votes of the effective answer are obtained in above-mentioned parking lots for three days.
③ Collection of related materials
We collect materials on the number of users of facilities such as roads, accommodations and so on.

TABLE 2. CONTENTS OF QUESTIONNAIRE

| |
|---|
| 1) Attribute<br>Sex, Age, Resident place, Job,Members of the group,<br>Attribute of the group,With or without a infant or an elderly person,<br>The frequency of the visit within this year,Purpose of visit |
| 2)Sightseeing route<br>Orign and destination of the day,Places to visit,Staying places of the day and the day before,Means of traffic, |
| 3)Consideration of visitors for system of guide to the parking lot<br>Necessity of guide to the parking lot,The change in the plan by the information on congestion of parking lot,The content of the change of the plan |
| 4)Reaction to pay system of parking lots<br>Approval or disapproval to pay system, Selection of parking lot due to virtual experiment |

## 4.3 METHOD TO AGGREGATE INVESTIGATED DATA

To estimate the traffic flow of visitors in the entire region, the result of the questionnaire is aggregated, being weighted according to each parking lot. To make estrangements minimum between the value obtained by questionnaire and the observed value, the weight is calculated by the minimum mean square method. Table 3 shows the item used as an observedvalue.

TABLE 3. OBSERBED VALUES USED TO CALICUTATE WEIGHT

| Name of obserbed value | Number of it |
|---|---|
| The number of cars to use each parking lot | 10 |
| The traffic volume of each entrance | 2 |
| The traffic volume of each exit | 2 |
| The number of staying visitors on the day and the day befor | 2 |
| The taffic volume of Hangetu-toll Road | 1 |
| The total number of values | 17 |

## 5. THE NUMBER OF CARS TO USE PARKING LOTS AND TRAFFIC VOLUME ON INVESTIGATING DAYS

### 5.1 TRAFFIC FLOW ON INVESTIGATING DAYS

The number of cars, 12 hours traffic volume, which flow in the object region is 12,000 on August, 15, 10,000 on August 16 and 8000 on October 20. It is Figure 2 to show the location of the traffic volumes on the investigating days in the daily traffic volume of the National Road 120th line in the year. The traffic volume on 15th is much in the 3th , it on 16th is in the 11th and it on 20th is in the 50th.

Days when traffic congestion occurs in Oku−nikko region are about 60 days annualy and the investigating days correspond almost at the level of three steps of the congestion. It is Figure 3 to estimate the number of cars staying in the region according to time on investigating days. About the 4,000 cars stayed there at the peak time on the 15th. 3400 on the 16th and 3500 on the 20th. The reason why the number on the 20th is more than that of the 16th is that the rate of the day trip guest is high in the autumn tint season. It is thought that there is a possibility to improve the traffic congestion enough by the policy using the parking lot effectively because there seems to be no big extragement between the number of cars and the capacity of the parking lot in total.

Table 4 shows the ratio of traffic according to the activity. 80 percent of the entire traffic is sightseeing and driving, 20 percent is the outdoor recreation. The rate of the outdoor recreation is high in the period of summer. Namely, there are many visitors enjoying hiking, climbing mountain, and camps. On the other hand, the ratio of bird−watching and taking a picture is high in the period of the autumn.

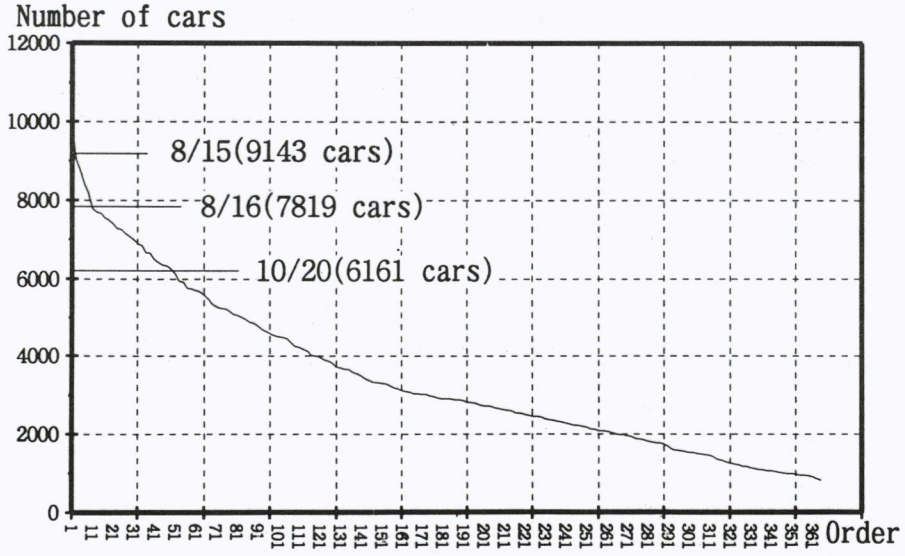


**FIGURE 2. ANUAL DAILY TRAFFIC OF IROHA SLOPE (THE NATIONAL HIGHWAY 120TH)**

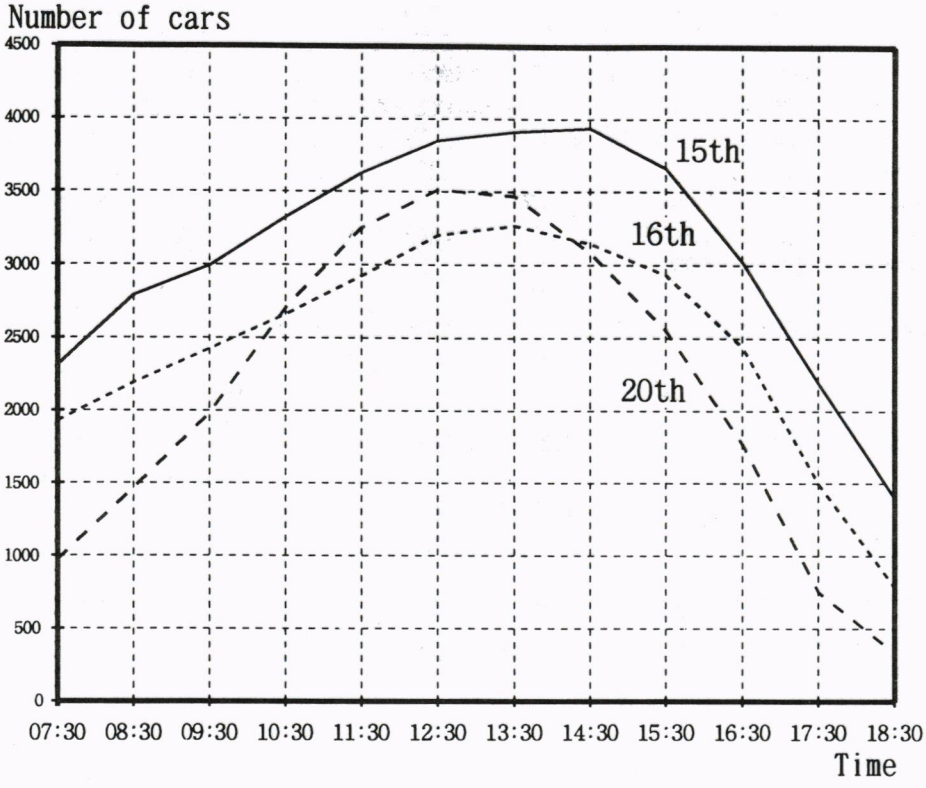


FIGURE 3. THE NUMBER OF STAYING CARS ON INVESTIGATING DAY

TABLE 4. NUMBER OF VISITING CARS ACCORDING TO THE ACTIVITY

Number of cars

| | 8/15 | 8/16 | 10/20 | Average |
|---|---|---|---|---|
| Sightseeing, Driving | 9202 | 7684 | 6799 | 7895 |
| Hiking, Climbing mount | 1426 | 1013 | 286 | 908 |
| Bird-watching, Taking pictures | 283 | 193 | 448 | 308 |
| Fishing | 134 | 61 | 0 | 65 |
| Camping | 439 | 737 | 0 | 392 |
| Others | 381 | 203 | 81 | 222 |
| Total | 11866 | 9891 | 7614 | 9790 |

## 5.2 CURRENT STATE TO USE PARKING LOTS

Figure 4 shows the use rate of the parking lot according to time on investigating days. It is understood that only a part of parking lots became, in a part of time zone, state of full cars on the 16th and the 20th while on the 15th, almost parking lot was filled with the car all day long.

The following two points are enumerated as a reason for the concentration on a part

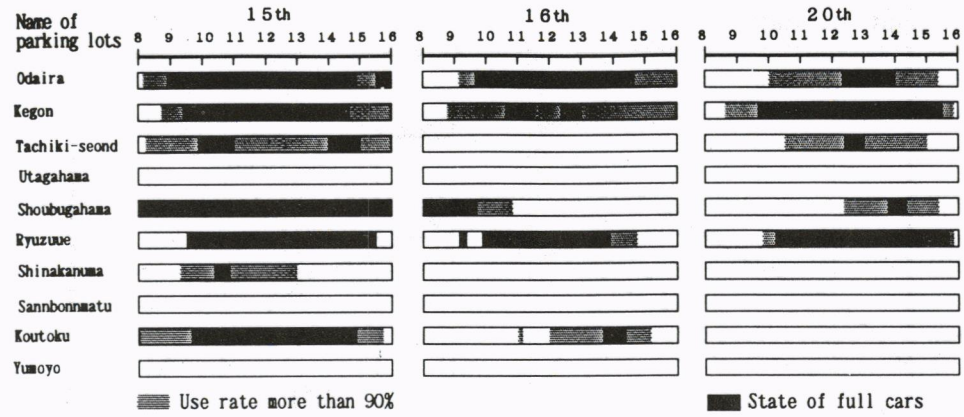


FIGURE 4. USE RATE OF THE PARKING LOT ACCORDING TO TIME

TABLE 5. RATE OF EACH PARKING LOT USE ACCORDING TO THE ACTIVITY

(%)

| Activity | Ohdaira | Kegon | Utagahama | Tachiki second | Shobugahama | Ryuzuue | Shinakanuma | Sanbonmatsu | Kotoku | Yumoto | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sightseeing, Driving | 90.2 | 92.7 | 78.8 | 94.8 | 62.2 | 91.1 | 26.6 | 78.5 | 82.3 | 72.9 | 80.7 |
| Hiking, Climbing mount | 3.2 | 2.3 | 4.4 | 0.0 | 8.2 | 3.3 | 49.1 | 10.4 | 10.5 | 15.0 | 9.2 |
| Bird-watching, Taking pictures | 1.9 | 1.3 | 3.1 | 0.0 | 4.0 | 2.4 | 17.1 | 2.3 | 0.0 | 5.2 | 3.2 |
| Camping | 3.0 | 3.7 | 8.5 | 2.3 | 23.6 | 0.9 | 4.4 | 0.0 | 5.8 | 4.9 | 4.0 |
| Others | 1.8 | 0.0 | 5.2 | 2.9 | 2.0 | 2.4 | 2.7 | 8.7 | 1.4 | 2.0 | 2.9 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

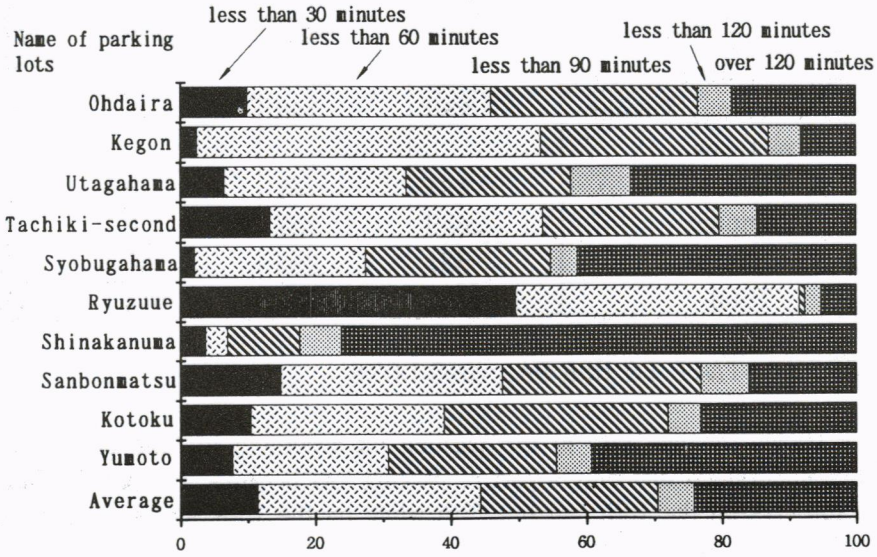


FIGURE 5. DISTRIBUTION OF USE TIME ACCORDING TO THE PARKING LOT

of parking lot besides difference of the charm of each block. First, being luck of information on the parking lot the user concentrates on the parking lot easy to find. Second, because a part of visitors uses the parking lot for a long time from the early morning, visitors who use the parking lot in a short time concentrate to a part of parking lots.

Table 5 shows the rate of the activities for visitors to enjoy according to each parking lot. Moreover, the distribution of time using each parking lot is shown in Figure 5. The distribution of the parking time is largely different in activities. On the parking lot which visitors of sightseeing and driving use, there are a lot of rate of short time use. On the parking lot which visitors who enjoy camping and climbing mountain and go on a hike use, the rate of long time use is high especially.

### 5.3 THE CHARACTERISTIC CONCERNING USE FORM OF THE PARKING LOT

① It can be guessed that there are about 10 days when most parking lots become brimmers in a year and that there are about 50 days when a part of parking lots is crowded in a year.
② It is thought that it is for about 50 days when a part of parking lots is crowed that the examined parking lot policy functions most effectively.
③ The parking time is largely different in the activity. The distribution of parking time is largely different according to the rate of it.

## 6. INFLUENCE OF INFORMATION ON CONGESTION OF THE PARKING LOT TO CHANGE IN TRAVEL PLAN

### 6.1 NECESSITY OF INFORMATION CONCERNING PARKING LOT

In the scenic area, not having clear traffic information, a lot of visitors select the traffic behavior. However, because the freedom degree of the selection is higher than that of general traffic, it is thought that the influence of traffic information is especially large in the scenic area. Table 6 shows the consideration of visitors concerning the necessity of it. About 80% of visitors feels the necessity.

TABLE 6. NECESSITY OF INFORMATION ON USE STATE OF PARKING LOT

(%)

| | 8/15 | 8/16 | 10/20 | Average |
|---|---|---|---|---|
| Very necessary | 40.8 | 38.6 | 38.3 | 39.4 |
| Necessary | 40.3 | 44.5 | 38.4 | 41.2 |
| Both either | 10.3 | 5.8 | 10.8 | 8.9 |
| Not necessary | 8.6 | 11.1 | 12.5 | 10.6 |

Information on the parking lot influences two levels of the traffic behavior. One is

change in the travel plan among blocks and the other is the selection of the parking lot in the block. The latter can be guessed because of a large difference among parking lots on the rate of local use. Because local visitors who are repeaters have information on the parking lot which becomes empty. On account of the former, offering information is divided into two steps. The first step is an offer immediately before entering the Oku−nikko region and the second step is an offer in each block.

## 6.2 INFLUENCE OF OFFERING INFORMATION IMMEDIATELY BEFORE ENTERING THE REGION

Table 7 shows the rate of visitors who change the travel plan to get the information. The higher the rate to change the plan grows, the more it is crowded. According to the activity, Sightseeing and driving indicate higher rate to change it than outdoor recreations. As for the outdoor recreation, it is largely different at each activity.
Table 8 shows the content of the change. It is largely different at the activity. The rate of adjustment of time is high in outdoor recreation while, in sightseeing.driving, it is high rate to change and to decrease the dropping points.

TABLE 7. RATE OF VISITORS (OFFERING INFORMATION IN ENTRANCE TO CHANGE TRAVEL PLAN)

(%)

| Date | Change | Not change |
|---|---|---|
| 8/15 | 42.4 | 57.6 |
| 8/16 | 30.0 | 70.0 |
| 10/20 | 12.6 | 87.4 |
| average | 29.6 | 70.4 |

TABLE 8. CONTENT OF CHANGE IN TRAVEL PLAN (OFFERING INFORMATION AT ENTRANCE)

| Content of change / Activity | Chaging the place to visite | Decreasing the place to visit | Ajustment of time | Returnning home without visiting | Others |
|---|---|---|---|---|---|
| Sightseeing, Driving | 41.8 | 12.5 | 17.7 | 28.0 | 0.0 |
| Outdoor recreation | 39.6 | 3.5 | 47.4 | 6.9 | 2.5 |
| Hiking, Climbing mount | 46.9 | 2.3 | 46.5 | 0.0 | 4.2 |
| Bird−watching, Taking pictures | 16.9 | 0.0 | 76.5 | 6.6 | 0.0 |
| Camping | 35.6 | 0.0 | 57.1 | 7.3 | 0.0 |
| Others | 36.3 | 16.1 | 10.4 | 37.3 | 0.0 |
| Average | 41.4 | 10.7 | 23.8 | 23.6 | 0.5 |

## 6.3 INFLUENCES OF OFFERING INFORMATION IN THE BLOCK

The rate to change the travel plan concerning sightseeing and driving is following. 71% of them is to change destination. 7% of them is to ajust time. 22% of them is to

change nothing. It shows an almost constant value with regardless to the level of congestion. It is a result that more than 70% of them change dropping points. This value is larger than the value at offering information at entrance.

## 7. INFLUENCE OF CHARGE SYSTEM TO SELECT A PARKING LOT

It is thought that the charge system of the parking lot influences the traffic behavior among blocks and selection of a parking lot in the block. Only the latter is analyzed as follows because the influence of the charge system on the former is smaller than the influence of traffic information.

Table 9 shows the consideration of visitors on the approvalor disapproval to make charge of the parking lot. The rate of agreement is high on the crowded day. That is, there is the tendency that resistance to making the charge becomes small in proportion to the degree of congestion. Then, it is thought that it is preferable to add the congestion degree of the parking lot to the variable on the factor of the behavior to select the parking lot.

TABLE 9. APPROVAL OR DISAPPROVAL TO PLAY SYSTEM OF PARKING LOT

(%)

| Date | 8/15 | 8/16 | 10/20 | Average |
|---|---|---|---|---|
| Agreement | 23.9 | 17.0 | 12.9 | 18.6 |
| Passive agreement | 28.2 | 36.3 | 30.1 | 31.5 |
| Oppsition | 42.7 | 40.8 | 53.0 | 44.8 |
| No judgement | 5.2 | 5.8 | 3.9 | 5.1 |

TABLE 10. MODEL FOR SELECTION OF THE PARKING LOT (DISAGGREGETE MODEL)

( ) t value

| Explanation variable | Sightseeing, Driving | Outdoor recreation | Hiking, Climbing mount | Bird-watching, Taking ctures | Camping |
|---|---|---|---|---|---|
| Parking fee (yen/time) | −0.004403818 (−13.1184) | −0.005036613 (−7.7573) | −0.005595207 (−5.3502) | −0.004509081 (−2.5741) | −0.007296122 (−4.3154) |
| Wating time (minutes) | −0.1441183 (−8.7294) | −0.1680616 (−5.2717) | −0.267063 (−4.7095) | −0.2644524 (−2.6871) | −0.01921769 (−0.3119) |
| Walking distance (m) | −0.003246542 (−9.8786) | −0.003590292 (−5.6777) | −0.003456873 (−3.2461) | −0.005409749 (−2.9964) | −0.003191432 (−2.4503) |
| Rate of a occupation | 0.4123495 ( 3.2885) | 0.2955261 ( 1.6715) | 0.7393515 ( 1.9854) | −0.1248422 (−1.6071) | 1.07837 ( 3.1405) |
| Number of sample | 1396 | 400 | 169 | 67 | 98 |
| $\rho$ 2 | 0.1466 (0.1441) | 0.1795 (0.1712) | 0.2513 (0.2331) | 0.2413 (0.1931) | 0.1987 (0.1646) |
| Corresponding rate to actual choice | 68.05 | 70.25 | 72.78 | 71.64 | 73.47 |

Table 10 shows the result to construct the disaggregate model on selection the parking lot according to the activity. Congestion degree is represented by the average rate of an occupancy in each parking lot and added as a variable that is different between free and toll parking lots. Others, namely walking distance, charge and waiting time are treated as a common variable. Moreover, the charge is a value per one time. Resistance of the outdoor recreation to a walking distance, the charge and waiting time is larger than that of sightseeing and driving. Especially, resistance to the charge is hard in the outdoor recreation.

## 8. NUMBER OF DROPPING POINTS AND PARKING HOURS

A relation exists between parking hours and the number of the dropping points. Because visitors assume places to visit on a day, the number of dropping points decreases as parking hours in a place lengthen.

### 8.1 PARKING HOURS ACCORDING TO THE ACTIVITY

Parking time is largely different in activity. Table 11 shows the average time of parking according to activities.

TABLE 11. AVERAGE PARKING TIME AT EACH ACTIVITY

Minutes

| Activity | 8/15 | 8/16 | 10/20 | Average |
|---|---|---|---|---|
| Sightseeing, Driving | 108 | 103 | 54 | 88 |
| Hiking, Climbing Mount | 333 | 229 | 160 | 275 |
| Bird-watching, Taking pictures | 198 | 150 | 150 | 162 |
| Camping | 1727 | 1185 | — | 1485 |
| Others | 363 | 190 | 36 | 269 |

### 8.2 CONGESTION DEGREE AND PARKING HOURS

Figure 6 shows the relation between the average of parking time and the number of dropping points. We can find the tendency that parking time lengthen and the number of dropping points decreases as congestion is violent. Therefore, it can be said that the rotation rate of the parking lot become lowers as congestion becomes cruel.

Table 12 shows the result of the analysis. Namely, it shows the influence which the parking lot policy give to the traffic behavior of visitors, the influence of the activity and the congestion degree as a special factor in the scenic area.

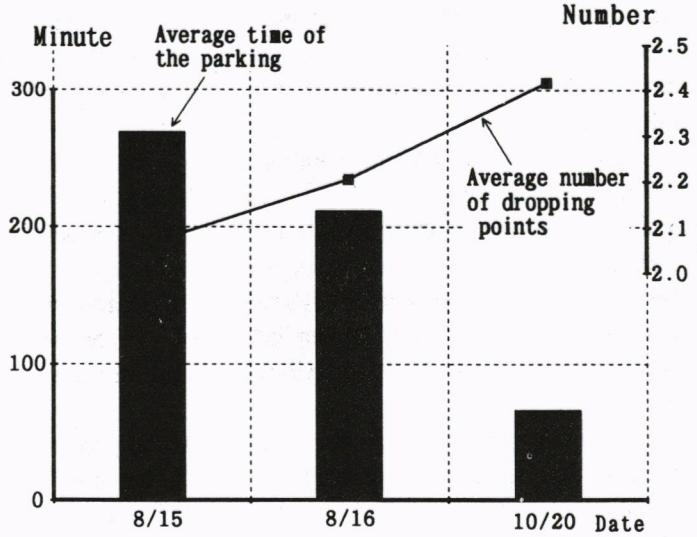


FIGURE 6. RELATIONS BETWEEN AVERAGE OF PARKING TIME AND NUMBER OF DROPPING IN POINTS

TABLE 12. SUMMARY OF ANALYSIS

| | Influence of strategy | | Influence of factor | |
|---|---|---|---|---|
| Traffic behavior of visitors | System of guide to parking lot | Charge system | Activity purpose | Congestion degree |
| Change in dropping point | * | | * | * |
| Selection of parking lot | * | * | * | * |
| Decision of parking time | | * | * | * |

## 9. POLICY TO USE PARKING LOT EFFECTIVELY IN SCENIC REGION FROM THE ASPECT OF TRAFFIC BEHAVIOR OF VISITORS

In the current state, there is big bias in the use of the parking lot. The purpose of these policies is to distribute the use of the parking lot spatially and timewise. We arrange the idea on the policy of effective use of parking lot by the system of the guide to parking lot and the charge system from the finding obtained through the above-mentioned analysis.

① First of all, it is necessary to clarify functions of each parking lot. For instance, they are parking a lot attached to road, a parking lot temporarily used when it is crowded, a parking lot for long time use to enjoy outdoor recreation, a parking lot for short time use for sightseeing. The following two are objects of making to charge.
② The charge difference achieves the function of each parking lot previously described. In that case, it is necessary to consider enough difference of the action to select the parking lot by the activity. It is effective to make to charge by time unit price of the parking lot. The parking lot for a short time use for the tourist can secure the function to assume the charge by setting the time unit price relatively

high. Moreover, it is effective to clarify the allotment of the function that they make the charge change according to the congestion degree. Through these policies, spatial and timewise decentralization of the user is accomplished and effective use of parking lot is achieved in the block.

③ The position of the parking lot and information on the use state are offered to visitors by introducing the system of the guide to the parking lot. The user reviews the travel plan and changes the dropping point according to the information. When the congestion degree rises, the rate to change the dropping point grows high. Moreover, the rate of it is high according to sightseeing compared with the outdoors recreations. Therefore, the effect of offering the information is larger for sightseeing than for outdoors recreations. Visitors are distributed by the change in the dropping point among blocks.

④ The adjustment of the parking time in the block is accomplished by the charge system, so the rotation rate to use the parking lot rises and visitors are distributed timewise between blocks. The use state in the block and among blocks influence each other mutually.

⑤ It is important to clarify accurately the period when these policies operates effectively to decide the investment for the management of them. Especially, it should be considered that the rotation rate of paking lot falls as becoming of the congestion degree violently.

## 10. CONCLUSION

① We clarify characteristics on the traffic behavior of visitors in scenic area having excellent natural resources.

② The frame of the policy to use the parking lot effectively was qualitatively clarified.

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