Survey Research for Terminal Station Guidance Services Based on Customer Requirements

The Frontier Service Development Laboratory is researching systems to offer appropriate guidance services to passengers at terminal stations. In this research, we conducted an online survey on customer requirements for Tokyo and Shinjuku Stations and found that there was much demand for “easy-to-follow directions” in terminal stations. Next, we analyzed the mechanism by which passengers in stations acquire information. Results of analysis and of feedback surveys at Tokyo Station allowed us to identify current issues with guidance services. Based on those, we improved guide signs in Tokyo Station and compared results of passenger evaluation before and after the improvement.

**Keywords:** Customer requirements, Terminal, Station, Guidance service

### Introduction

Easy-to-follow guidance services at terminal stations are an important issue for railway operators. The Frontier Service Development Laboratory is thus researching systems to offer appropriate guidance services to passengers.

In this research, we used Tokyo Station and Shinjuku Station as typical examples of terminal stations in the JR East operation area and surveyed customer requirements for guidance services at terminal stations. Here we will introduce the results.

**Table 1** Overview of Survey on Passenger Requirements for Tokyo Station

<table>
<thead>
<tr>
<th>Survey method</th>
<th>Online survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey period</td>
<td>August 1 - 3, 2006</td>
</tr>
<tr>
<td>Survey target</td>
<td>1,260 male and female users 12 - 69 years of age who have used Tokyo Station once or more within a year</td>
</tr>
</tbody>
</table>

**Fig. 1** Demands for a Station Representing Japan

2.1 **Making Tokyo Station Easy to Navigate and Attractive**

Tokyo Station is a typical terminal station that has developed as a gateway to Japan’s capitol, Tokyo. In order to determine the policy for improving in-station facilities and services to meet increasing expectations and demands of passengers, we carried out an online survey of behavioral characteristics of users of Tokyo Station (Table 1).

As a result, demands for a station representing Japan were items related to ease of navigation, such as having easy-to-follow signs and information desks and easy and convenient transfers. Those were followed by items related to attractive spaces, such as having amenity-rich spaces, wide passages and attractive space design. Those clarified that there is demand for Tokyo Station to be an easy to navigate and attractive (Fig. 1).
2.2 Making Shinjuku Station Easy to Move in and Easy to Navigate

Shinjuku Station in a subcenter of Tokyo is a terminal station used daily by the largest number of people in the world. In order to identify expectations for Shinjuku Station, we carried out an online survey of behavioral characteristics of users of that station (Table 2).

As a result, expectations for Shinjuku Station in the future were that it be easy and convenient for getting on/off and transferring trains and have an easy-to-follow structure and layout as shown in Fig. 2. Those clarified that there is demand for Shinjuku Station to be easy to move in and easy to navigate.

Table 2 Overview of Survey on Customer Requirements for Shinjuku Station

<table>
<thead>
<tr>
<th>Survey method</th>
<th>Internet survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey period</td>
<td>July 11 - 22, 2008</td>
</tr>
<tr>
<td>Survey target</td>
<td>6,080 male and female users 15 - 69 years of age who have used Shinjuku Station once or more after June 16 2008 (Mon.)</td>
</tr>
<tr>
<td></td>
<td>Sampling by sex, age, residential area, getting on/off or transfer</td>
</tr>
</tbody>
</table>

In this research, we observed from a cognitive psychology perspective how passengers acquire information and how that leads to behaviors. We also observed what can hinder acquisition and considered the information system that should be offered at stations.

3.1 Search Actions and Information Acquisition by Passengers

Search actions of passengers can be divided into the phases of searching by looking around, selecting a route and proceeding on that route (Fig. 3). When searching by looking around, passengers look around to find target information. Once that information is acquired, passengers proceed on that route. While proceeding on the route, passengers follow the selected route while comparing the obtained information with spatial information.

It is clear that there are some barriers in those search actions (Fig. 4). Specifically, those are the barriers of recognition, determination, decision and confidence. It has been suggested that a person cannot take actions at ease and cannot be satisfied when those barriers are present.
3.2 How Guidance Services Should be Provided

Based on our findings on search actions, the following policy was developed as the ideal way to provide guidance services for passengers to remove the barriers in information acquisition.

- Remove recognition barrier
  - Make the search target and guide sign easier to find in the searching by looking around phase.
  - Secure clear view in the space.
  - Enhance the eye-catch of guide signs.

- Remove determination barrier
  - Provide information boards that passengers can stop to check.

- Remove decision barrier
  - Show the current position of the passenger.
  - Show the direction of the destination.
  - Collect and simplify complicated information.

- Remove confidence barrier
  - Make check of acquired information and spatial information easier in the phase of proceeding on the route.
  - Make guide signs more consistent, continuous and simple.
  - Enhance the identity of the space (Fig. 5).
    (Allocate distinct colors, textures and landmarks to individual areas and use those for directions too.)
  - Make customers feel at ease by information from station personnel.

4. Improvement of Guide Signs in Tokyo Station

In this research, we identified problems in Tokyo Station where we had scheduled improvement of guide signs, and we applied information on those problems in new guide sign design. After improving guide signs, we carried out feedback surveys and compared results of passenger evaluation before and after the improvement.

4.1 Securing Clear View of the Station

It is important in allowing passengers to obtain information that recognition barriers be removed by securing a clear view of spaces. This makes objectives and guide signs easier to find. We surveyed the areas in the central concourse of Tokyo Station where we can clearly see the ticket gates as indicators, and we found that four ticket gates could be seen only from a limited area of the central concourse (Fig. 6).

Furthermore, we found when surveying the number and area of the signs and ads in view that there were as many as 95 signs and an average of 60 in the field of view (Fig. 7 (a)). Ads accounted for about a half of both of the number and the area (Fig. 7 (b)). We believe that the large number and area of ads and their being mixed with signs inhibited clear view of space and the eye-catch of guide signs.

We therefore worked to secure clear view of the station by rearranging and consolidating guide signs when improving them.
4.2 Introduction of General Information Board

At the same time as rearranging and consolidating guide signs, we formed a hypothesis that introducing general information boards would be effective in removing determination and decision barriers. General information boards show the current location and direction of the passenger stopping in front of them, and replace diverse information with simple information.

The hypothesis was well received in feedback surveys (Fig. 8) conducted along with other improvement proposals (Table 3). And surveys on favored places to install such general information boards revealed that passengers wanted them to be installed at the start points of movement and at junctions. Start points of movement are places just inside the ticket gates and on the platform, and junctions include places in view just down the stairs from platforms and intersections of passages (Fig. 9).
4.3 Overview of Guide Sign Improvement
The conditions explained above were taken into account when redesigning guide signs. The main points of the design are as follows.

- Introduction of general information boards (Fig. 10)
  - Consolidate and display information such as in-station maps, location of exits, information on facilities around the station, route maps and information on stops of trains.
- Make users aware of directions with branching signs attached at the upper part.
- Reviewing the number and amount of information of guide signs and relocating them
  - Guide signs competed with each other for view by users before the improvement (Fig. 11).
  - Secure view of concourse after the improvement (Fig. 12).
- Illuminate internally gate signs at stairs to platforms (Fig. 13).

![Fig. 10 General Information Board](image1)

![Fig. 11 Concourse (before Improvement)](image2)

![Fig. 12 Concourse (after Improvement)](image3)

![Fig. 13 Gate Sign at Stairs](image4)

![Fig. 14 Change of Ratio of Users Becoming Lost Before and After Improvement of Guide Signs](image5)
4.4 Comparison of Situation Before and After Improving Guide Signs

We carried out two types of surveys. One was a feedback survey where 200 participants took actions alone and then replied to a questionnaire. The other was an observation survey where 20 participants took actions while being accompanied by an observer.

In the both surveys, we specified in advance a route to a destination point to which past surveys showed people often get lost. We gave the subjects only the name of the destination. After they walked in the station using guide signs only, we evaluated the guide information according to data such as to the ratio of subjects who could reach the destination, the time required, places where the subjects stopped and details of the reasons why they got lost.

Based on the ratio of the subjects who could reach the destination without problems in the feedback survey after sign improvement, we identified the level of difficulty to reach the destination after the improvement and compared to results of the feedback survey before the improvement (Fig. 14). The comparison demonstrates that the ratio of the monitors who could reach the destination without problems increased overall.

We also compared assessments of guide signs before and after improvement (Fig. 15). Results showed that the subjects who replied both legibility and coloring were good increased.

The points of dissatisfaction identified before the improvement were location of guide signs, amount of information and number of guide signs in Tokyo Station. The number of subjects who agreed or somewhat agreed that guide signs are located where necessary increased. Similarly, those who felt that the amount of information of guide signs and on the number of guide signs in Tokyo Station was appropriate also increased. That proves that passengers positively assessed the review and relocation of necessary guide signs.

Finally, we compared satisfaction with the station before and after the improvement of guide signs (Fig. 16). The results clarified that the easier-to-navigate station layout thanks to improved guide signs improved overall satisfaction with station.

5 Future Issues

5.1 Coordination between Guide Signs and Spatial Design

In current terminal stations, some users are not sure of the direction and get lost because of lack of spatial characteristics. This can probably be overcome by improving ease of understanding directions through giving the space more features as a part of the total design of the station and using those features for guidance services. In the future, we will need to study measures to enhance the identity of spaces in the station and coordinate that identity with guide signs.

5.2 Coexistence of Guide Signs and Ads

Ad media and guide signs are displayed intermixed in current stations. In this research, we thus rearranged and consolidated guide signs. Issues we will have to study in the future will be adding the perspective of improved value to ad media, achieving a balance between ad media and guide signs and presenting amenity for passengers spending time in stations.