Interpretive Article

Amenity in Station Space

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Although amenity is formed by various elements, the perception level of amenity changes with the individual, environment, and situation, and thus it is not possible to define this term with only one word. For this reason, the reality is that it is not clear at which level amenity should be realized. The concept of amenity, however, is nevertheless essential when discussing what our future station space should look like. In this paper, an overview of "amenity" and an approach to realization of comfortable station space will be described.

1 Introduction

The first item of the group vision of New Frontier 21, which is our intermediate management plan, is to become a group that can create "reliability," "amenity" and "impression" in the fields of creation of customer value and pursuit of customer satisfaction. This vision implies that the concept of "amenity" is a necessary and important element in services. At the same time, however, we all well know that the impression that customers get from the word "amenity" differs with each customer. In that respect, it may be difficult to create station space that is comfortable to everyone or for that matter to specifically define what comfortable station space is. What we are thinking during the course of planning, or conducting engineering work or studies is realizing various aspects of amenity; therefore, I would like to introduce the concept of amenity that must be considered in such activities.

2 About amenity

It was the late 1970's when the word "amenity" started to become recognized throughout Japan. The word amenity, according to the official translation of the Environment Agency, seems to only emphasize physical aspects such as "comfortable environment," but it is considered to originally include the "quality" aspect represented by the environmental status or agreeability of attitudes, as defined by William Holford, a British city planner, as: "under certain conditions, the right things (house, warmth, light, clean air, domestic services, for example) are in the right place, and overall, it is comfortable." When referring to his definition, our Japanese understanding of amenity may be somewhat one-sided.

Although the word "comfort" is used quite often, it is difficult to specifically define it. According to Kojien, it means "in good conditions and feels good." "Good conditions" means that people and the external environment have a good mutual relationship, and "feels good" indicates the result of such good interaction. Therefore, it is possible to say that the concept of comfort is a sensation that people can experience in the relationship between themselves and their surrounding environment. In other words, it is some kind of relaxed feeling that is generated in individuals as a result of interactions with objects or places.

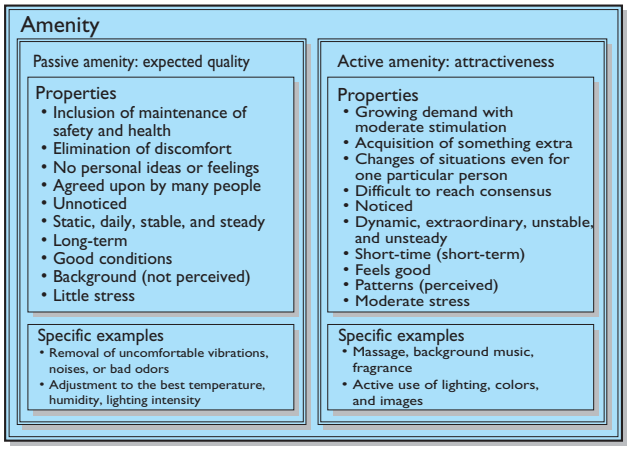


Fig 1 : Two aspects of amenity 3) 4)

It is generally understood that there are two aspects to amenity: "pleasant" and "neutral." Pleasant is a favorable state, and neutral is a state without unpleasantness. Therefore, it is understood as a combination of active amenity and passive amenity (Figure 1). If the approach described in the special feature article is applied, the former can be labeled as amenity in silence, and the latter can be labeled as amenity amidst congestion.

The reason why it is difficult to specifically clarify the concept of amenity is that this concept needs to be comprehensively considered in terms of the relationship between people and space (environment). Furthermore, amenity may be perceived as a result of independently understanding the two aspects of it, or it may be perceived as a result of the interaction of these two aspects. Hence, perception of amenity is not always the same, and this is why amenity cannot be understood in simple terms. For example, perception of amenity changes with: situation, meaning why and how individuals are at certain places; context, meaning how individuals arrive at that place or space or simulation of such experience; threshold, meaning how individuals

Table 1: Example of environmental factors that influence amenity of space

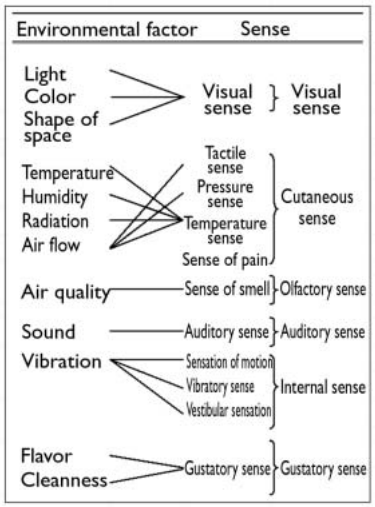
Environmental factors	Detailed factors
Thermal environment	Temperature
	Humidity
	Air flow
	Heat radiation
	Sunshine
	Amount of clothing
	Amount of activity (metabolism)
	Temperature difference
Audio environment	Noise
	Silence
	Echo, resonance
	Sound absorption, sound insulation
	Sound volume, sound pressure
	Sound quality, tone
	Music
	Soundscape
	Masking effect
	Rhythm
	Fluctuation
	Ultra low frequency sound
	Ultra high frequency sound
	Sound of drains
	Talking voices
	Background noise

Environmental factors	Detailed factors
Vibration environment	Train vibration
	Ground vibration
	Low frequency aerial vibration
	Vibration while running
	Inertial force
	Acceleration
	Fluctuation
	Aerial vibration
	Vibration due to regular daily activities
Air and olfactory environment	Cleanness
	Cigarette smoke
	Bad odors
	Smell of food
	Chemical substances
	Crowdedness and body odor
	Mustiness of air-conditioners
	Smell of trains and train seats
	Scent
	Smellscape
	Aromatherapy
	Phytoncide
	Aromachology
Air pressure environment	Pressure variation
	Wind due to running trains

Environmental factors	Detailed factors
Visual environment	Lighting method
	Lighting intensity, brightness
	Glare
	Distribution of brightness and lighting intensity
	Color of light source
	Color rendition
	Color temperature
	Direction of lighting
	Shadow
	Design
	Shape
	Layout
	Color and color distribution
	Images reminded of by colors
	Gloss
	Outside light
	Scenery
	Moving image
	Garbage and dust
	Robustness
Tactile environment	Material
	Hot and cold
	Comfort of seats
	Hardness or softness

Environmental factors	Detailed factors
Spatial environment	Size
	Height of ceiling
	Openness and closeness
	Visibility
	Direction of viewing
	Personal space
	Congestion degree
	Space around seats
	Moving distance
	Moving time
	Load caused by travel
	Travel method
	Spatial and directional cognition
	Affordance
	Symbolism
	Arrangement in space
Gustatory environment	Criteria for taste aversion
	Factors for remembrance of taste
	Flavor
	Cleanness
Personal environment	Hospitality
	Personal service
	Speed of flow of people
	Density of flow of people

Table 2: Example of human senses and environmental factors



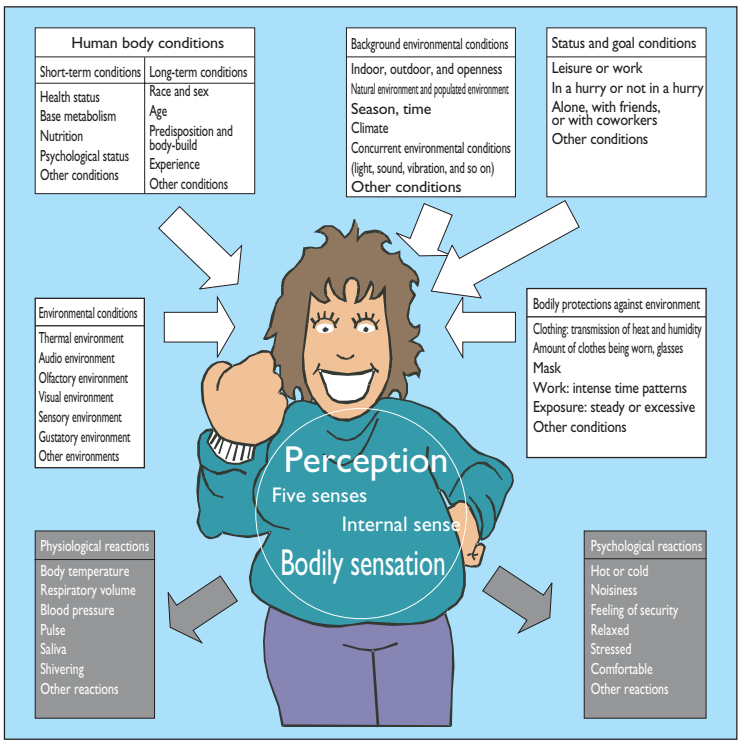


Fig.2: Relationships among human body, environment, and reaction[5)]

are used to certain inputs; and bias, meaning changes in status of individuals or social cultures. To summarize, perception of amenity relies on complex relationships between people and various status of these people in that space. In other words, external factors with the physical aspect and internal factors with psychological as well as physiological aspects seem to influence the perception of amenity.

Now we will consider how people perceive amenity. First, people accept their own feeling. People use a combination of the five senses and an internal sense to perceive environmental elements such as thermal environment, audio environment, vibration environment, air and olfactory environment, air pressure environment, visual environment, tactile environment, spatial environment, gustatory environment, and personal environment (Table 1). Then people will accept the environment (Table 2) and evaluate or respond to that environment (Figure 2)[Note].

As described above, and as many people already know, improving amenity is not a simple matter of improving any one of the above factors. Individuals add various biases originating from changes in physiological status, psychological status, individual differences, and social cultures to these factors, and comprehensively and complicatedly evaluate these factors to finally perceive the amenity of that space.

So far, although we have been trying to realize comfortable station space, we have hardly considered in detail the differences that people perceive for each of the environments. This is partly because creation of a standardized environment has been emphasized, and also because individual differences in perception of lighting intensity or heat have been averaged. The most significant reason perhaps is because reduction of the physical discomfort of congestion has been prioritized. In other words, amenity amidst congestion has been studied. In the current situation in which the standard of living has been on the rise, however, users will have increasing demands, and thus planning the creation of a standardized environment is no longer sufficient. This implies that it is essential to respond to the individual differences described above in creating an environment satisfactory to everyone, and that it is time to implement active measures to create comfortable space for as many customers as possible while prioritizing reduction of uncomfortable space. Through this, there is a possibility that the

degree of discomfort may be reduced in complex environments even though there are no changes in the fact that there remains some discomfort. Therefore, I think it is necessary to take measures to increase the degree of comfort in addition to the measures to reduce discomfort.

3 Perception of amenity

Amenity, as described above, is considered to be understood as a complex concept. Then, what do customers actually think of it? By using the Internet, a survey was conducted in February 2003 polling a total of 1,300 males and females ranging in age from teenagers to those in their 60s living in Tokyo and three surrounding prefectures. They answered the question "what should be done to make the station that you usually use more comfortable?" and their replies are as shown in Figure 3. Since the respondents use different stations, they perhaps perceive the "status of the station" in different ways, but still, it is possible to see that they view the concept of "amenity" in a wide variety of ways. Some respondents wish the "neutral" aspect would be improved, and some wish the "comfort" aspect would be improved. Some even suggest factors affecting amenity from a view that has not been discussed so far. Furthermore, respondents had different levels of demand for amenity. Therefore, when trying to improve amenity, it is necessary to keep such diversity of opinions in mind.

4 For realization of comfortable space

It has been discussed so far that, in order to proactively realize comfortable space, it is important that not only appropriate measures be taken for each kind of environmental factor, but we also need to study the environment as a complex integration of such factors. Let us introduce some examples. In the case of the thermal environment, it is widely known that the level of amenity changes with not only the temperature but also with humidity, air flow, heat radiation, sunshine, and metabolic calories (that change with clothing, posture, and the degree of activity of each individual). However, even under identical conditions, the most comfortable temperature still varies according to season, health, time, era, age, sex, race, and so on, showing that it is not necessarily the same for everyone at anytime. Furthermore, the perception of amenity may become different if the visual or audio environment changes. For example, people may feel a little bit cooler when they hear a wind chime or the sound of a stream, or when they see pictures of forests or a waterfront. There are also study results showing that color temperatures and lighting intensity also influence perception of amenity (Figure 4). Some people may have the experience of feeling a little warmer when they are in a bright place or in a place with a lighting with a warm color than when they are in a dark place or in a place with a white light. Some academic theories state that this has not been statistically proven, but still it seems that, experientially, there are events that have psychological influence. As

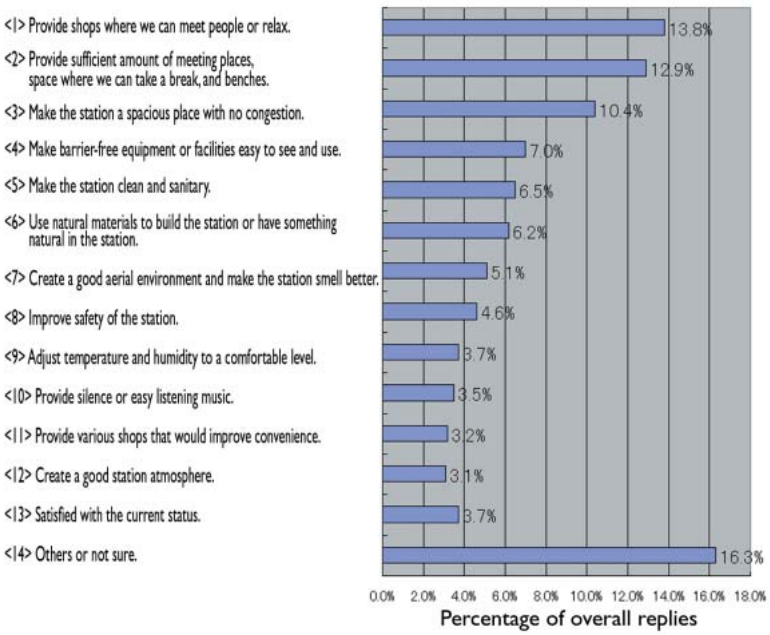


Fig.3: What should be done to make the station more comfortable? (N = 1,272)

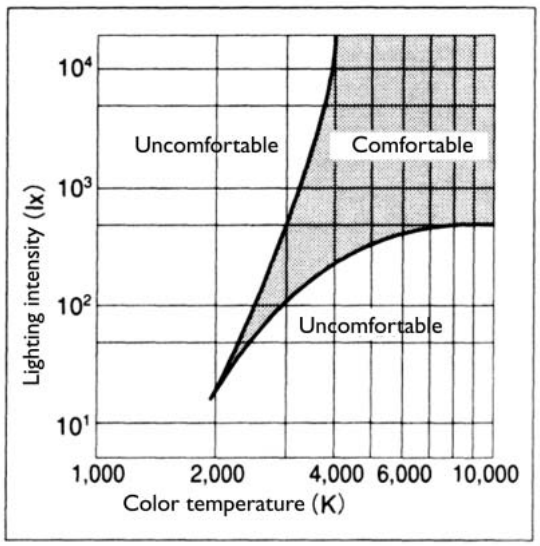


Fig.4: Relationship between color temperature and comfort [3]

seen above, there exists a large number of factors that influence perception of temperature, and thus it is reasonable to say that it is difficult to define what specifically is the most comfortable temperature. So, amenity cannot be determined only by direct factors such as temperature or humidity.

There has been a case example where a statistical method was used to indicate how amenity should be realized. This method attempts to show what kind of environment should be prepared so that people will feel comfortable in it. The American Society of Heating, Refrigerating, and Air conditioning Engineers (ASHRAE) defines that the amenity of the thermal environment is "the situation where a person is comfortable enough to express satisfaction with the heat environment" and determines that a particular environment is considered comfortable if more than 80% of the people in a group can express that they are satisfied with the surrounding environment (established in 1981, reference value: 55). Whether or not this "80%" is adequate may become one of the future topics, but nevertheless, the idea of solving the problem of complex factors with a statistical method should be accepted.

As for sound, which is one of the other amenity elements, when the sound that notifies passengers of train departures changed from a bell to a melody at Shinjuku and Shibuya stations, there were complaints that it had become noisy even though the volume itself was reduced. At the same time, however, those who had visual impairment stated that the new sound made it easy for them to grasp the space. This example shows that individual differences lead to difference in perception of sound. In order to create a comfortable audio environment, the abovementioned statistical method could be applied. In this case, however, deciding the percentage as a comfort criterion becomes important.

So far, amenity in terms of environmental factors has been discussed, but there are other factors that influence perception of amenity: factors that directly influence people's psychology. Understandability and user-friendliness are examples. Feeling of security can also serve as an amenity factor. Although they may be understood as environmental factors for visual, tactile, or audio environment for example, they should still be thought as what directly influences psychological or cognitive aspects of individuals. The concept of universal design that has been widely addressed recently can be considered as one of the approaches to amenity improvement that takes cognitive consideration such as understandability and user-friendliness into consideration.

5 Conclusion

In academic fields such as psychology, when there are elementalist approaches based on the individuality of environmental factors and holistic approaches such as gestalt psychology in which the overall relation is focused on, one of the methodologies must be selected and used to academically analyze causal relationships. When attempting to realize amenity in a practical way, although it is not possible to improve the overall amenity by improving any one of the elements, it is still the fact that the most influential element has to be improved with emphasis. In this case, then, some of the improvement measures must compromise with mere upgrading of facilities or physical objects. However, employment of the holistic idea may provide the possibility for approaching this issue from different aspects. Therefore, it will be necessary to incorporate results of elementalist discussions into the holistic approach. Also, considering that the space must be sustainable in the global environment in the future, it is necessary to take two approaches to realize amenity: an active way through introduction of new technologies and a passive way to realize amenity through incorporating the natural environment.

Specifically speaking, for various elements that influence amenity, it will be important to define clear amenity criteria, and plan and implement amenity improvement in the long-term and comprehensive perspective, followed by incorporation of the result of examination and evaluation of the implementation into the next improvement plan. Also, for a complex environment, it will be important to /1/ eliminate uncomfortable situations, /2/ examine the "comfortable" elements that will reduce and conceal uncomfortable situations, and /3/ actively add "comfortable" elements. In doing so, "comfort" must be considered in terms of perception, psychology, bodily senses, physiology, and cognition.

When improving amenity, it is necessary to thoroughly examine its cost effectiveness and to clarify the service level that amenity requires. In other words, it is necessary to determine if the environment should be as comfortable as possible or if the amenity must be restricted based on the consideration of human adaptability. Then, based on the conclusion, amenity must be examined thoroughly at the early stage of the improvement plan so that appropriate ideas can be incorporated into the plan. Only such practice can minimize the cost of realization of amenity.

The Frontier Service Development Laboratory of the Research and

Development Center JR East Group has been conducting various studies for realization of amenity in station space. Although there are various items to be examined, we hope to provide results that will serve as future guidance. Realization of amenity is a perpetual problem, but we will make further efforts to realize it so that customers can use railways with satisfaction.

(Note) In this paper, reaction to amenity is described as a series of reactions: sensory input -> mental process -> motion output. There is, however, a theory such as the affordance concept in which mental processing is skipped and a reaction (motion) is made directly. This theory seems to be starting to gain acceptance recently.

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