Visitors' Viewing Behaviors in front of Several Types of Aquariums

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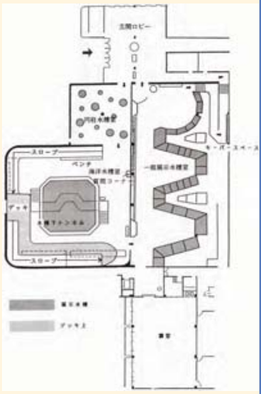
1 Introduction

Popular aquariums with convenient transportation are over-crowded on weekends. Since many people visit those popular aquariums, congestion prevents visitors from appropriate viewing and studying. Then we studied visitor' s flows by checking population density from sparse hours to over-crowded hours.

2 Targets and Methods



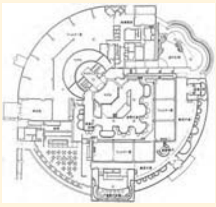
The research was took place in the following two aquariums in Japan.

1) Tokai Aquarium

The aquarium is not situated in a convenient location. Usually the visitors such as students and tourists arrive by private buses and many ordinary visitors use local buses on weekends. There are three zones; a zone with bristling cylinder form tanks, a zone with 360 all around view constructed with a tunnel under the tank, and a zone with train window type tanks.

2) Kasai Aquarium

The number of visitor reaches more than 20,000 sometimes, and it is temporarily very crowded. As many types of water tanks (half way viewing big tank, donut shape tank viewing from inside the ring, tanks that are constructed in alcoves, etc.) exist, the visitors' flow is influenced by the width and space of each aisle.



We tracked the visitors at Tokai Aquarium and studied the different viewing patterns at slow hours and busy hours. At Kasai Aquarium, we counted the number of entries and exits at one zone every five minutes the entire day.

We define the following on the xth span of five-minutes.

- number of incoming people of the area or room : I(x) (x=0 to t)
- number of outgoing people of the area or room : E(x) (x=0 to t)
- numbers of existent viewers of the area or room : ΣI(x)-ΣE(x) (x=0 to t)

Based on these data, we could calculate the number of entries and exists in each five-minute span.

1) Existent viewers' density per width of water tank (pers. / m)
2) Existent viewers' density per space (pers. / m^2)
3) Coefficient of stay *

* "coefficient of stay" means the approximate quantity of the length of viewers' existences : (ΣI(x)-ΣE(x)) / E(x) (x=0 to t)

We compared busy hours and slow hours and sought for visitors' characteristic in different hours.

3 Results and Investigation

3-1. Viewing Characteristics at Tokai Aquarium

We found one feature at the big tank zone. At this zone, visitors spent long time on viewing the inside the tank from various angles when not crowded. However, since the view from the other side of the tank was easily expected, many people had no tendency to go to the other side. And, we also saw people just walking around the big tank once. On the other hand, we also found that people who saw other people going to the tunnel followed the same action. (Fig.1)

As a result, we found that there were more viewing patterns created when crowded. When not crowded, visitors did not pay much attention to other people' s action so that there were less viewing patterns.

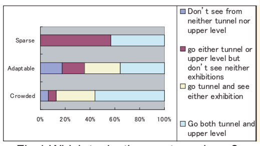


Fig.1 Which tanks they go to and see?

3-2 Viewing Characteristics at Kasai Aquarium

1) At the big water tank

At the big donut formed water tank zone, the number of exits slowly increased as population density got higher at the zone (the number of exits used as indication of people' s flow).

Therefore, as it got crowded, people' s flow increased. In this case, we found that the congestion was not influenced by people' s flow. However, when it got extremely crowded, the number of exits increased up to a certain point and stayed the same after the point. In the different words, the number of exits got higher as people' s flow increased but slowed down when extremely crowded. (Fig.2)

Next, we studied the relationship between viewers' density and coefficient of stay and found that coefficient of stay tended to increase as it got more crowded. We discovered that people tended to do other viewing actions such as sitting on the benches and stay longer during busy hours compared to less busy hours. At this zone, since people viewed from many different angles, their viewing positions were spread out. In addition, as visitors also enjoyed different views from closer and farther positions from the tank, a variety of viewing options were created for the visitors. (Fig.3)

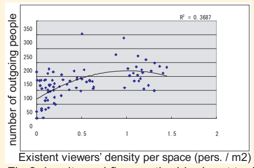


Fig.2 density and flow on the big donut tank

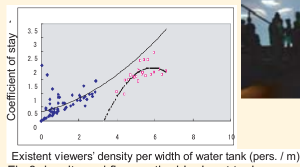


Fig.3 density and flow on the big donut tank

2) At the train window type tanks

At the train window tank zone where the tanks were located on one side, people' s flow was not much interrupted by the crowd. And, we also found that coefficient of stay increased at a certain point and raised as viewer' s density level got higher. (Fig.4) However, when density level was extremely high, coefficient of stay slightly decreased. This phenomenon was caused by the fact that people tended to skip the tank and went to the next tank instead of waiting for the crowd to be gone.(Fig.5)

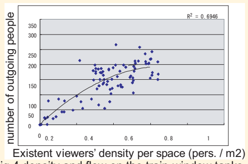


Fig.4 density and flow on the train-window tanks

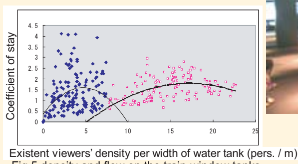


Fig.5 density and flow on the train-window tanks

4 Conclusion

We categorized congestion level into four groups: sparse, adaptable, crowded, and over-crowded.

1) At the big water tank

We found that people' s viewing style was more diverse in front of the big tank due to the length of their stay; whereas there was only limited viewing style at the smaller tanks.

At congestion level between sparse and adaptable, people tended to follow the other people' s viewing actions; in the other words, people' s actions were influenced. People looked the creatures in the tank from a variety of angles, and it became very effective that the aquarium functioned as educational entity.

When crowded, more studying methods were produced at the tanks where people had more variety of viewing options. As congestion level increased from adaptable to crowded, people discovered more options. At this level, people had to wait until the crowd in front left. Nevertheless, visitors changed their positions and found different viewing points while waiting at the big tank.

We estimated that it would become more effective if there were more physical viewing options around the big tank such as viewing on a bench, from a high position, from the other side of the tank, from a distance, etc.)

2) At the train window type tanks

As congestion level became crowded from adaptable, density level increased. And people waited until other people left. People' s flow speed became slow and staying time became longer.

This was caused by the accumulation of visitor' s waiting time and viewing time. Besides, people who wanted to take time to view each tank were hasted by the other people approaching from behind. On the other hand, as people had to follow the flow, they were to view the creatures that they were not interested in.

When congestion level turned from crowded to over-crowded, people just looked at the tank titles and skipped them as they were not interested.

Over-crowded situation prevented people from viewing as they liked and induced them to skip the tanks. It is desirable that the congestion be dispersed with such methods as admission control and so on.

As a result, better educational environment would be produced for all the visitors at the aquariums.

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Grand Ballroom
Time: 08:00 – 18:00

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Key words: congestion, visitor, viewing behavior

Abstract

Some attractive and marquee aquariums which locate in convenience area with good traffic condition often have a large number of visitors in holidays. The exhibition space may be sometimes too crowded to study for visitors who like to know aquatic life. The aquarium as a learning environment has to be considered to offer the environment in which visitors can see and watch carefully.

We surveyed the behavior of visitors at a marquee aquarium. The analysis were done by some indicators such as rate of congestion (density of the area in front of certain tank), number of existent people in the area or room, number of incoming people and outgoing one of the area or room during each five minutes. We surveyed during all day long so that we can compare the empty cases with the crowded situations of the room by observing the flow and behavior of visitors.

As the result of our study, it has been made clear that sometimes the tanks in “train window”-type exhibition are passed through in the crowded time. The ocean tank is allowed to be seen freely in both crowded time and empty.

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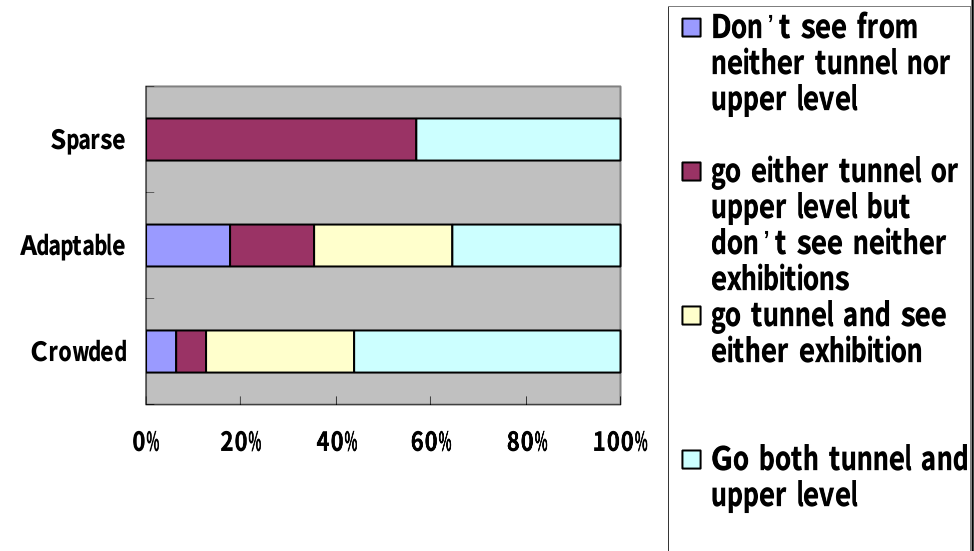

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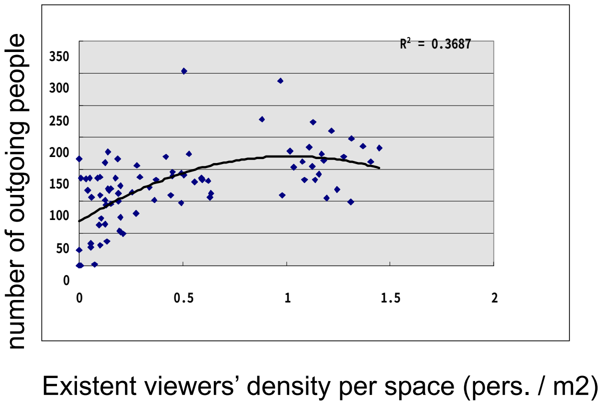

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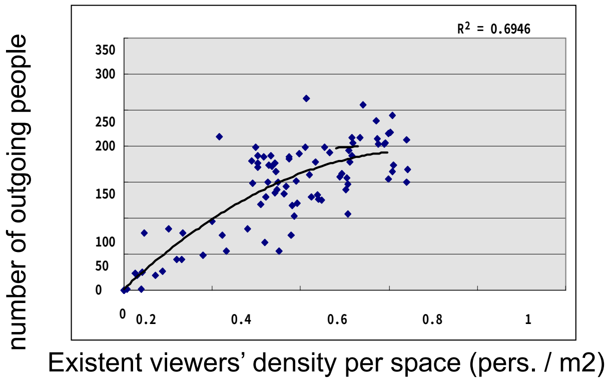

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