

Queue Management

There is no magic in managing theme parks !

By Peter van Lith - 29-May-2002

Introduction

Many theme parks are suffering from declining attendances. Although studies have been carried out as to the possible causes for this, not many definite answers have been found. General survey results indicate however, a very high customer dissatisfaction rate with relation to long waiting times. Therefore many parks would like to address this issue.

Contrary to what some theme parks would like us to believe, magic is of no assistance in solving this problem. It does not mean that there are no options. First of all, we must accept the current capacity of the attractions as fixed. There might be some incidental improvements in the occupancy by better loading schemes and perhaps by improving on maintenance. The gain expected from these measures may, however, be marginal.

Because we cannot change the capacity, we must concentrate on visitor flow through the park. That leaves us with addressing the queues themselves. First of all the queues need to be made more attractive. In reducing queue lengths there are two things that can be done: Moving the queues in time and relocating them in space. Although we cannot make them any shorter, we may move them to a different time and/or a different location. This paper intends to show what may be done about that.

How to get rid of queues

Before we look at ways and means of addressing the problems, let us first consider the queue problem itself. Several solutions have been proposed over the past few years. The following systems are currently known by the author:

Name	Characteristics	Advance Booking	Reser-vation	Cust-Token	Attractions
Disney FastPass	Advance booking system. Allows limited number of customers to reserve for 1 attraction at a time. Tickets are issued. Separate entry required.	No	Yes	Ticket	1
Alton Towers	Advacne booking system. Tickets are issued		Yes	Ticket	
Lo-Q	Electronic device lets customers make a reservation. System warns when customers may enter attraction. Separate entry required.	Yes	Yes	Electr device	Multiple
Sea World	An individualized map is offered with timetables	No	No	Map & Timetable	Multiple
Multi Motions	Booking via Internet or computer. Integrated with Customer Information System.	Yes, Internet	Yes	Smart Card, Tickets	Waiting Snake

There may be more systems in existence or under development, but what they have in common is that they aim at arranging some kind of appointment, where the customer is free to spend the waiting-time in a more meaningful manner, and preferably at a location that is of more benefit to the theme park.

There are some other options to consider, however. First of all, systems that involve a virtual queue where people are waiting in another location than the physical queue itself are by nature limited in capacity. The option cannot be offered to all customers. When a customer has made a reservation and shows up for the appointment, a new queue forms. If 50% of the people would be accepted for this secondary queue, the queue length would be equal to the 'normal' queue and no apparent gain would be achieved. So by definition, the number of customers that can use an advance booking system will need to be much lower than 50%. Fortunately only a limited number of customers seem willing to plan their day in advance.

Also new queues tend to develop when making a reservation. Either a central system is used, or some form of booking per attraction is used. A queue will form to make these reservations. Using the Internet to make a booking will eliminate most of this kind of secondary queuing. So, customers must get some sort of choice, so that they may choose between booking in advance, booking at any time during a visit, or to make no booking at all.

An important issue here is that entering an attraction is experienced by most people as a reward for actually having put in some effort. If there were to be no queue at all, it would create the impression that the value of the attraction is to some extent diminished. In general terms, one may observe that attractions with short queues tend to attract less public. So, in principle we should not aim at the *elimination* of queues, but instead concentrate on giving people an option to join the queue, or to skip part of the queue and spend the wait somewhere else.

The most important point would seem to be that of improving the experience factor of the customer, by changing the apparent ratio between waiting and riding. Several methods exist to offer customers such a choice.

Queue Equalization

During a day, peaks and valleys occur in queue length. It makes sense to try to equalize queue lengths as much as possible during a park day. The simplest way of achieving this is by providing information about queue lengths to the public. In providing this information, it is assumed that people will automatically flow towards areas of least congestion.

Some parks have already installed electronic information boards; others are using blackboards to inform the customers. There are, however, some less obvious problems with this approach. Suppose that at a certain location in the park, a notice is placed that the current waiting time at an attraction is 30 minutes, while the other attractions all are around 60 minutes. This will probably result in a large flow of people towards the quieter attraction. By the time they arrive at the attraction, the waiting time will have increased, depending on the number of people heading in that direction.

So what needs to be published is not the current waiting time, but the *expected* waiting time, for those arriving at the attraction. To provide this kind of information, the published waiting times need to take into account the position of the information board, the time it takes to get from there to the attraction and the estimated number of people that might decide to go there. Currently this kind of information is not easily available. It follows therefore, that the published times may vary for each information point. Therefore the location of the signposts is an important issue. We will return to this point.

Enter the waiting snake

Analogous to the European currency snake, where a number of currencies are connected in a moving string, the waiting snake connects a number of attractions. This synchronization between attractions is meant to allow customers to wait for the collection of attractions instead of waiting for each of them separately.

Waiting is the main activity of theme park visitors. Although most people would deny this is an attractive prospect, it nevertheless is where people tend to spend most of their time during a visit. However this is not the selection of choice. It is a necessary evil that needs to be tolerated, in order to get to the rides. During a

typical day, a customer will spend roughly one hour in attractions and about two hours walking about and in restaurants. The remainder is spent in queues or other unattractive locations. So more than 60% of the customer's time is lost in unattractive and boring activities.

The worst place to have to wait for an attraction is in a queue. Many parks are trying to make the lines more comfortable and even more attractive. Some attempts have been made to split up the lines and to decrease the perceived waiting time. Sometimes even the queue itself is somehow turned into a kind of mini-attraction.

These are all sensible approaches. However it would be much better if the visitors would be able to decide for themselves where to spend their waiting time. As said before, waiting time cannot be avoided, but wouldn't it be nice if a customer could spend waiting time in restaurants, shops or maybe other locations that can be selected by the customer.

So what we propose is to do the equivalent of what bakery shops do, they let you get a numbered ticket, indicating your position in line. Given enough information, this provides us with an opportunity to give a prognosis of the expected waiting time. Now, suppose that when we go shopping, we would also get a ticket at the grocery and the butcher. If we are lucky, we might wait just once and then do all our shopping in one fell swoop.

This is what we intend to do in the park as well. By synchronizing a number of attractions, that share the same type of interested parties, and that have a similar loading behavior, we might be able to design a number of connected queues, that we call a waiting-snake. If the attractions of such a waiting snake can be synchronized, you may ride all attractions in the snake in sequence without any intermediate waiting, once you have completed the principal waiting period. This might dramatically improve the wait-to-ride ratio. If in addition the waiting time might be spent elsewhere, then this would mean a much more satisfied customer.

Where to spend your waiting time

Suppose that our wish were to be granted (does this sound like magic?) and workable waiting snakes can be found, then our customers would have an option as to where to spend their waiting time. They could walk around the park, visit a shop or a restaurant or they might even wait while riding another attraction. In the worst-case scenario they could go and stand in line for another attraction, but that is for hard-core visitors only.

We will return later to how we might achieve this goal, but one of the pre-requisites is to have sufficient knowledge about the number of people in a family as well as their ages and preferences. Having information about their interests would help a great deal. And while we have this information, it could be used to our advantage as well, since it might be used to make suggestions to our customers, as to where to spend their waiting time. Having access to such important marketing information has some interesting side benefits, since it may be used by interested third parties. This could stimulate cooperation with sponsors to attract the public to their products.

By making offers to the public and by providing suggestions we could encourage them into visiting a certain restaurant or shop. We could even introduce sponsored waiting-time attractions, where sponsors would be able to provide information to customers, provided they give this information a high attraction value.

This way the total park turnover could be increased and the waiting time is no longer lost time, but may be turned into a useful, entertaining and profit increasing advantage. Who said that there is no magic?

How to achieve these goals

The million-dollar question is, however, is this really possible? Much depends on the ability to find workable waiting snakes, to be able to synchronize attractions and to get sufficient information on which to

base this whole system. It means that a sophisticated computer program is required, which will keep track of visitor load, their interests, their current as well as their expected locations.

The first step in this process is to find out what would happen to waiting times if a scheme like this were to be introduced. This is done with the help of a specially developed Park Simulator program. This simulator calculates the waiting time for every family, based on an assumed pattern of interest. It simulates the behavior of all families in a park and lets them make decisions about attractions to ride, paths to follow, restaurants to visit etc.

Several games exist that let you define your own theme park, its attractions and then lets you ride them. The Park Simulator is no game, but an advanced program that models the behavior of a full day of park attendances, including calculated loading times, malfunctions and other possible distractions, all based on actual statistics. Since this data is different for every park, there is no general answer, but based on the characteristics of a certain park, all these effects may be measured.

Using this simulator, we are able to study what would happen if we allow a number of families to join a waiting snake. So we use this to find out at what percentage of preferred riding-times there is a noticeable influence on general waiting times. We also would like to find out what is the upper limit of the number of people joining the snake before the snake's waiting time becomes as long as the main queue.

Of course not all people will want to be managed in such a way. This is fine because, as long as the minimum number of people that impact the waiting time are willing to participate, the scheme still works. This simulator has been built and tests are now underway to find out these important factors. No definite answers are known yet at the time of writing, but we expect that more will be known by the time of the TILE presentation. A short demonstration of the simulation system will be given during the presentation. Also the factors involved are depending on the actual park that is being modeled.

Of course when the simulation indicates that the scheme works, it will still have to be developed in reality. This means that the simulation will later on assume the role of the operational queue management system. First of all, the simulated families in the park will be replaced by information about real customers. But we still need to continually make informed guesses about what these people might want to do. This will be based on statistical information and descriptions of a number of stereotypes, indicating the various types of expected behavior. This system will provide the basic information to predict the probable behavior of park visitors.

Predicting the waiting times

Of crucial importance is the ability to predict occupancy of the attractions and the resulting waiting times. This is the main aim of the Park Simulator. Providing this information is important during the analysis phase where we determine the feasibility of the idea of waiting snakes.

But it is also needed to find out how important the positioning of the information boards is. We promised to come back to this earlier. What is the influence of the number of information boards and their placement? Some parks provide once central board. In order to find out the waiting time for an attraction you either need to go to the attraction and check or walk to the central boards. Having multiple boards has the effect that people can make informed decisions about where they would like to go at several places, which saves walking time.

With the park simulator a study can be made to the effect of placement of the boards. By altering the number of boards and their placement a clear indication can be given about the effects of board placement, based on the characteristics of the park.

As indicated before, the information of the signposts does not necessarily need to be the same, since the expected waiting time is also related to the distance from the information board. In some instances it might be desirable to publish times other than the actual waiting times, for instance when an attraction needs to

close down. In that case, publishing a much higher waiting time will make sure that the number of visitors drawn to it will decrease.

In addition it is probably much better to give an indication if the waiting time is increasing or decreasing in addition to the predicted waiting time.

Where to get the information

An important aspect of the system is the ability to get information about customer profiles. To participate in a waiting snake, the customer must provide this information. Because of privacy regulations it has to be made clear that the information will only be used inside the park, but that its use may extend further than just deciding waiting times.

Another attractive source of information is allowing people to purchase a ticket through the Internet. In doing so, they would be able to select one or more waiting snakes for the day being booked. This will have a number of interesting effects. First of all it supplies a long-term view of expected occupancy, which will help in planning park management. It might also be an indication to other customers who want to know how crowded a particular day is likely to be. Thirdly, by having customers pay in advance, their spending in the park at a later time might be higher than if they would have to pay for everything on the same day. The number of advance bookings is a clear indicator of the expected occupancy and using the information collected with the help of the park simulator, also the expected popularity of the rides during a given day may be supplied to customers informing in advance.

Another possible source of information is sponsors. Arrangements can be made with sponsors, who could reserve a block of tickets for their customers. The park could then provide them with the special waiting-snake tickets on condition that the sponsor collects the required information. Sponsors could be offered an opportunity to use this information to possibly attract their customers to their own pavilion or attraction in the park. In this case it would be advantageous to have a separate entrance for such clients and to allow the sponsors to handle the logistics of their customers in the park or to do this internally.

For people who do not want to book in advance either through the Internet, mail or via sponsors, a space will need to be provided, where bookings for the waiting snake can be made. Here a family might receive a specially printed day plan, along with a roadmap related to their snakes and maybe special 1-to-1 marketing information provided by sponsors and the park. Several such places could be set up in the park, also doubling as an Internet meeting place, where customers could spend some time browsing interesting information in addition to designing their plan for a day in the park.

In order to get enrolled for a snake, one of the Internet places needs to be visited and the plan booked. When the booking is done through sponsors, they will need to set up their own handling facilities in the park to allow bookings and printing of plans and promotional material. We would like to have as much as possible of this paperwork done in advance, allowing people to make their selection through the Internet and receiving their tickets and information by mail or by picking it up at a dedicated counter in the Park. Having a separate entrance where the snake tickets can be read automatically would also decrease congestion at the park gates.

Conclusions

The most frequent complaint of customers is the waiting lines. In addition waiting is very unrewarding. Clearly something needs to be done about it. Waiting lines cannot and should not be eliminated all together. Some amount of waiting is and should remain part of the attraction, but it should be made more manageable. With the introduction of the waiting snake, waiting itself can be managed. Both customers and park management should be able to make choices about where the waiting time should be spent.

Customers could spend their time elsewhere in the park, while park management should be able to balance the load between attractions and infill- or overflow locations like restaurants and playing facilities.

The park simulator allows detailed studies to the effects of such measures and monitors the traffic flow during a park day. In addition it allows advance bookings to be done, either in the park itself or before a visit through facilities like the Internet.

The collected information is used to get insight in the movement of queues and permits better planning of the capacity of park facilities. This will allow a more satisfying day for the customers and will increase total park turnover as a consequence.