ITE District 6 Data Collection Fund
FINAL REPORT

Multiplex Movie Theater Parking Generation

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Introduction

The purpose of this project was to collect parking data to help in the study of parking generated by a multiplex movie theater for use in the next edition of ITE's *Parking Generation* Informational Report (McCourt, 2004).

The CSUS Chapter collected data for three days: November 25th, December 23rd, and December 30th. These three dates were chosen because we wanted to observe the parking impact the holidays had on moviegoers. According to the *Parking Generation Informational Report*, these days should capture some of the busiest parking days of the entire year (McCourt, 2004).

The following is an overview of how the project was conducted and the results we gathered from the data collection.

Site Selection

The site selected by the CSU Sacramento Student Chapter was the Century 16 Greenback Lane Theater, located at 6223 Garfield Avenue in Sacramento. This theater was selected because it: 1) is a large multiplex with 16 screens, 2) has its own parking lot not impacted by other uses (shown in Figure 1), and 3) has only one entry/exit point (shown in Figure 2).

Figure 1. Sign Indicating: "Theater Parking Only"

Figure 2. Single Entry and Exit from Parking Lot

The fact that it had only one entry/exit point was a site selection criterion made by our Chapter. We realized that counting vehicles in a parking lot of this size every hour would be difficult, so we decided to choose a location were we could easily count vehicles entering and exiting. We discussed our plan with our faculty advisor, Dr. Kevan Shafizadeh, and our co-mentors, Mr. Jason Pack and Mr. Bob Grandy of Fehr & Peers Associates, at a preliminary meeting. Two sites were identified based on these criteria, and the Greenback Lane site was

selected (over another Century Theater site with only one entry/exit) after receiving verbal permission from the theater operator.

Data Collection Methodology and Revisions:

Preparation

Even before we started, we had to prepare to change the way we were going to collect data. Even though we were not planning to physically count each vehicle in the parking lot every hour, we knew that it was an option. A few days before the first day of data collection, however, Dr. Shafizadeh was contacted by Century Theater's corporate office, and our access to their parking facility was verbally revoked by someone in their "customer relations" department. He was told that security would be an issue if we were to walk around the parking lot once an hour. As a result, the theater was no longer willing to allow us on to their private property.

While we were considering a couple of data collection options, we met with Dr. Shafizadeh and Mr. Pack and we realized that counting entering and exiting vehicles from public right-of-way was the best strategy, given the size of the parking lot and the access limitations to the site.

The First Day of Data Collection

The data collection initially consisted of teams of two people per three hour interval. We did an initial count of the parking lot at 12 noon and a final count of the parking lot at 12 midnight. Throughout the day, one person counted the vehicles entering the parking lot while the other person counted the vehicles exiting.

This strategy seemed to work fine but we soon found out that to make our project work, modifications had to be made. When we did a quick count of the parking lot at midnight, we discovered that there was a discrepancy between the number of vehicles that we *expected* to be in the parking lot and the number of vehicles we *observed* in the parking lot. While we were able to adjust our counts to account for the discrepancy, it indicated that we needed to make some changes.

Revisions

Our first day of data collection was probably the most challenging because we did not foresee some of the difficulties we experienced. The team met with our faculty advisor and our co-mentors over pizza to discuss and brainstorm how to improve the data collection. For starters, we realized that starting at 12 noon was a problem. It was difficult for us to obtain an accurate count of vehicles in the parking lot because there were already too many vehicles parked in the parking lot to get an accurate count, and vehicles were already arriving and leaving the lot at a high rate. We concluded that our vehicle counts were probably not as accurate as they could have been if we had started earlier in the day. After looking at the

movie schedule, we decided to start the other two days at 10 am, before the showing of the first movie.

Another concern was safety. After witnessing the attempted theft of a car stereo during the first day of data collection and reading about other reported crimes at this site including an attempted robbery (see Sacramento Bee, December 9, 2005), Dr. Shafizadeh had serious concerns about our safety and security. While we discussed setting up automatic data (tube) recorders, we were concerned about the quality of the data and encroachment onto the theater property. Instead, on the second day of data collection, we changed the setup to three person teams. In addition, everyone in the team sat together at one location instead of at different locations with the best viewpoint. This modification provided additional security, in case of an emergency.

This strategy also seemed to work better for the data collection, because it kept everyone more alert and focused. When there were teams of two people for each three hour interval, the long hours may have led to fatigue during the data collection, ultimately leading to possible "counting inaccuracies." When a three person crew was used, the third person kept track of time and recorded the counts after each fifteen minute interval. The three person team could check with one another instead of wondering if they missed or double counted a vehicle. The third person was also useful when a break was needed by someone on the team.

The Second and Third Days of Data Collection

Despite pouring rain, the second and third days of data collection proceeded without any problems. The modifications we made proved to be useful as we had no problems counting vehicles in the parking lot at 10 am. There were fewer than 20 vehicles on both days, and they could be counted easily while driving around the parking lot.

Collecting Additional Information

Because the movie theater was unwilling to help us with this project, we had difficulty obtaining some of the background information about this site. We could not obtain information such as the site size or theater occupancy from the theater, despite numerous contacts with local management and corporate representatives of Century Theaters. With the help of Mr. Randy McCourt and Dr. Shafizadeh, we were able to get the additional information we needed from the County of Sacramento Department of Planning and Permitting.

According to the public "development application" records, this theater contained 2,900 seats and its parking lot contained 824 (we counted 820) parking spaces, which yields a "parking supply ratio" of 0.28 spaces per theater seat, which is consistent the ratio of 0.27 found at traditional theaters (p. 96, McCourt, 2004). The public records also indicated that the entire site sat on 10.4 acres of land, which only helped to confirm what we already knew – that it would have been very difficult to actually *count* vehicles parked in this parking lot! The records also confirmed that there was no transit service to this site. One of the reports stated:

"A bus stop exists on Garfield with a walkway up to the theater complex… RT [Regional Transit] discontinued use of this stop a number of years ago. The stop is available and should other transit entities choose to use it."

Despite repeated efforts to get additional information such as ticket sales and gross square footage, we were unable to obtain any additional information from Century Theaters.

Results:

The results from all 15-minute count intervals were all plotted on the same graph for comparison. As shown in Figure 3 below, we observed similar bimodal (two peak) travel patterns on all three days, while it is most pronounced on November 25th. The first peak hour occurred around 1:15 to about 2:15 PM, and the second peak hour occurred around 8:15 to 9:15 PM. It is possible that this pattern is capturing two sets of moviegoers. The afternoon peak may appeal to families with children. The evening peak may apply to teenagers or adults. During these peak periods, the parking lot was its closest to reaching capacity, but only seemed to reach capacity on November 25th, which seemed to be the busiest day of all we observed. This finding is consistent with those in the *Parking Generation Informational Report* (McCourt, 2004). On this day, we noticed that after the parking lot reached its capacity moviegoers were forced to use an unpaved overflow lot located off-site.
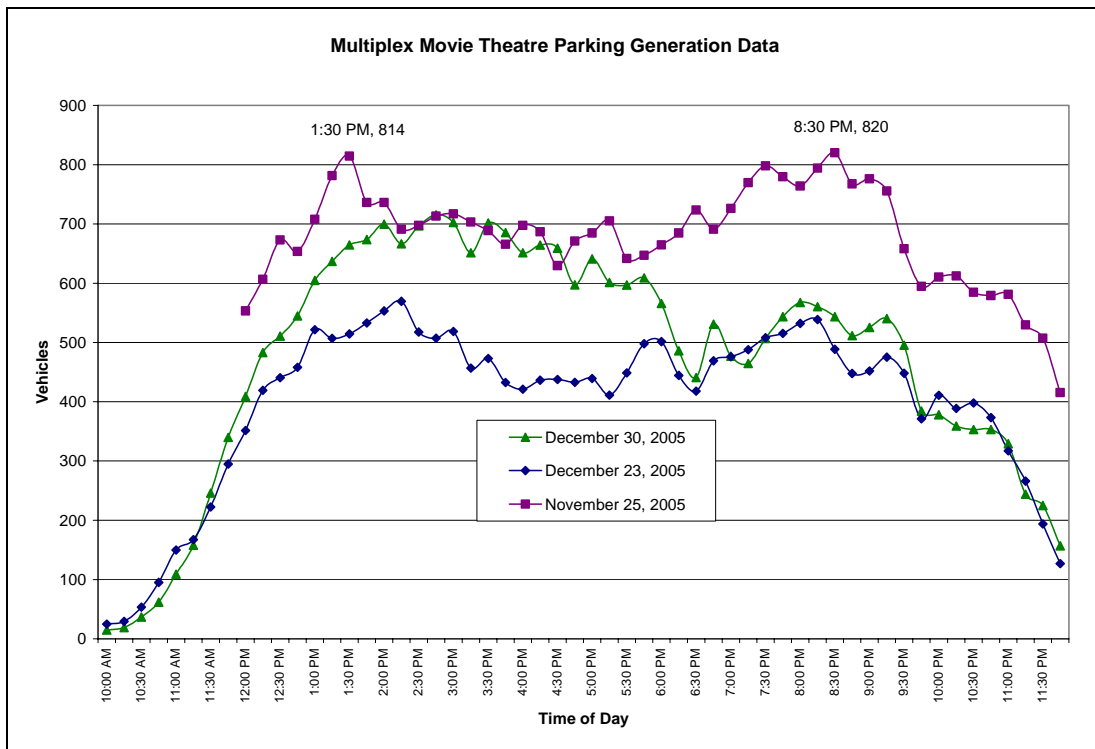

Figure 3. Comparison of Parking Generation Data for All Three Observed Days

What was unusual about the November day was that the average peak hour (consecutive 60-minute interval) was in the evening, while on the December days the larger average peak hour was in the morning as shown in Table 1. The smaller, or secondary peak, was almost as high as the larger primary peak on both November 25 and December 23. On December 30, however, the primary peak was much larger than the smaller secondary peak. A comparison is made in Table 1 below.

Table 1. Comparisons of Average Peak 60-Minute (Hour) Observed

Date	November 25	December 23	December 30
Primary Peak Period (Vehicles)	7:45 PM – 8:45 PM 8:15 PM – 9: 15 PM (tie – 790 vehicles)	1:45 PM – 2:45 PM (544 vehicles)	2:15 PM– 3:15 PM (696 vehicles)
Secondary Peak Period (Vehicles)	1:15 PM– 2:15 PM (767 vehicles)	7:30 PM – 8:30 PM (524 vehicles)	7:45 PM – 8:45 PM (554 vehicles)

If we compare the peak observation on all three days we obtain Table 2. The percentages shown are the ratio of each day compared to the highest average parking occupancy observed. We can see that the Friday after Thanksgiving is the peak period, followed by the Friday before New Years, then the Friday before Christmas. We suspect that people were too busy holiday shopping to attend a movie the Friday before Christmas.

Table 2. Comparisons of Peak Occupancies Observed

Holiday	Max Occupancy	Percent (%)
Friday after Thanksgiving (11/25/2005)	820	100
Friday before Christmas (12/23/2005)	570	70
Friday before New Years (12/30/2005)	716	87

Theater activity in North America is tracked on a web site called www.the-numbers.com. Based upon their information about ticket sales of the top ten movies for all North American theaters on the days of the data collection, the following information was found:

    November 25, 2005 = $58,415,568
    December 23, 2005 = $36,361,151
    December 20, 2005 = $44,600,000

Compared to other high days of the year for theaters (as noted in the *Parking Generation Informational Report*), the four Saturdays in July 2005 had the following ticket sales data for the top ten movies:

    July 2, 2005 = $46,793,854
    July 9, 2005 = $51,580,032
    July 16, 2005 = $56,469,006
    July 23, 2005 = $47,046,360

These data point to the fact that the day after Thanksgiving represents one of the highest, if not the highest, ticket sales day of the year for theaters throughout North America in 2005. Therefore, it would be representative of the peak activity day for this land use.

Conclusions

From our study, we can see that one of the busiest days for parking lots at multiplex movie theaters is the Friday after Thanksgiving. On the busy holidays, we also see a bimodal distribution of parking generation, where a peak occurs in the early afternoon between 1 and 3 PM and another peak occurs in at night between 7:30 and 9:30 PM. These data should be useful in correlating the number of screens with the amount of parking demand generated at multiplex movie theaters.

Additional Study

If we had additional time and energy, it would have been interesting to study if the duration of the movie plays a role in the amount of parking generated because the number of screens does not necessarily equate to number of movies being shown. For example on December 23, we noticed that "King Kong" was among the movies shown at this theater. "King Kong" runs for three hours. It cannot be shown with the same frequency as traditional two-hour movies, and it may not generate the same number of ticket sales or parking demand as traditional two-hour movies. It should be noted that on this day there were many other movies, such as "Cheaper by the Dozen 2" (1 hour and 40 minutes), "Fun with Dick and Jane" (1 hour and 30 minutes), "Yours Mine and Ours" (1 hour and 40 minutes), "The Ringer" (1 hour and 40 minutes), and "The Family Stone" (1 hour and 42 minutes), which could be shown more frequently than traditional movies two-hour movies. It can probably be assumed that these two effects cancelled each other out, but it is difficult to make any conclusions without obtaining ticket sales data from the theater. We made countless, persistent attempts to obtain ticket sales data from the theater without success.

It would also be interesting for another study to try to explain the parking generation patterns we observed. Was it because of the kind of movies that was playing? What age groups of people are attracted more during each time period? If we knew the answers to some of these questions, we could formulate hypotheses that could help explain why the peak hours are the way they are and why fewer people go the movies late at night. While some of these answers may have been explored if we had been able to obtain ticket sale data, for now we'll assume that people don't go at night because it's scary.

References

McCourt, Ransford S. (2004). *Parking Generation Informational Report, Third Edition*. Institute of Transportation Engineers. Washington, D.C.

The Sacramento Bee, "Robbers strike at theater," December 9, 2005. Available on-line at: http://www.sacbee.com/content/news/crime/story/13958035p-14792336c.html, Accessed January 12, 2006.