

CIRCULAR

Transportation Research Board, National Academy of Sciences, 2101 Constitution Avenue, Washington, D.C. 20418

SOLVING THE AIRPORT AUTO PARKING PROBLEM

Airport Operators Council International and the Transportation
Research Board Workshop

AOCI Annual Conference, New York, N.Y.

October 13, 1978

*Summary Prepared by Committee on Airport Landside Operations of the
Transportation Research Board*

On October 13, 1978, a workshop on airport parking was held at the Airport Operators Council International (AOCI) Annual Conference in New York. The workshop was organized jointly by AOCI and the Committee on Airport Landside Operations of the Transportation Research Board (TRB). The participants were as follows: Moderator - William M. Schoenfeld, Deputy General Manager - Facilities



modes

- 1 highway transportation
- 4 air transportation

subject areas

- 54 operations and traffic control

Planning, Los Angeles Department of Airports; and panelists -- Edwin Roth, President, APCOA, Inc., Cleveland; Martin Bloom, Chairman, Park-N-Fly, St. Louis; James T. Murphy, Director, Metropolitan Washington Airports, Federal Aviation Administration; and Richard W. Hall, Senior Consultant, Peat, Marwick, Mitchell & Co., San Francisco.

PRESENTATION 1

Edwin Roth, APCOA, Inc., Cleveland

APCOA began in 1949 with the operation of the first airport pay parking lot at Cleveland Hopkins International Airport. In the most recent year, APCOA gross revenues amounted to about \$1 billion. At airports, parking revenues probably were second in size only to landing fee revenues.

Two issues concerning airport parking will be addressed: expansion and control of revenues. Expansion. Parking lot demand at airports is considerably different from the demand for conventional parking facilities in metropolitan areas: for example, airport parkers park either for less than two hours (short term) or for the period of their trip (long term). Short-term parking spaces may turn over up to 8 times a day compared with 1-1/2 to 2 times a day for urban central business district parking.

Parking garages are a likely solution to the increasing demand for airport parking. The structures should be as close as possible to the passenger terminal and should serve both short-term and long-term parkers. Certain mechanical structured parking facilities have worked in Europe, but probably would not work in the United States. Before a commitment is made to a specific structural parking solution at an airport, it is important to make a feasibility study and to analyze the airport user traffic patterns at that particular airport.

Revenue Control. The background of cash register technology was reviewed; the electronic cash register has shown a great deal of promise for airport parking. However, it can be relatively slow--requiring as much as 20 seconds per average transaction. In its search for improved cash register technology, APCOA looked to the fast food industry. Fast food operations, like airport parking facilities, are concerned with relatively limited numbers of items and high flow.

Parking lot employee theft results in considerably lower losses than customer cheating schemes. Customer cheating, including ticket swap scams, results in a revenue loss of about 2.7%; cashier miscalculations, up to 0.4%; and employee dishonesty, another 0.1%.

Wherever there is a cash operation, the opportunity for revenue loss exists. A number of methods to minimize this loss can be employed, such as:

1. Employee screening during hiring, including lie detector tests if appropriate;
2. Daily reconciliations;
3. Use of roving audit teams (incognito);
4. Gross index checks (i.e., comparing parking lot revenues and passenger volumes and the like); and
5. Rotating employees at collection stations.

To date, no revenue control equipment has been devised that is foolproof or 100% reliable; therefore, successful parking revenue control systems require reliable backup procedures.

Some revenue control systems are not fast enough. The "ultimate" revenue control system would somehow label individual cars, but such a system has not been developed yet.

Factors that affect parking lot systems include the following:

1. Climate variability (weather, humidity, etc.),
2. Sticking of tickets,
3. Dust control (on photo cells),
4. Ticket sizes,
5. Electrical circuit disturbances which can result in altered time clock settings, and
6. Wild miscalculations which are otherwise unexplainable.

Regarding the efforts of equipment companies to devise better systems, there are some half dozen manufacturers in the revenue control market. Rather than try to design a single system for any and all airports, they should develop control system components which could then be combined into a package for specific applications at the individual airports.

The presentation concluded by stressing the importance of comparing the benefits (in terms of a reduction of losses) with the costs before deciding on a "revenue control system."

PRESENTATION 2

Martin Bloom, Park-N-Fly, St. Louis

The presentation began with a discussion of the evolution of the high level of service in the Park-N-Fly facilities. Only after operations were under way was it understood that a high level of service was the foundation of success for remote airport parking facilities.

When Park-N-Fly began operations at airports, its parking lots were lightly used. They had originally planned that patrons would be picked up by shuttle buses at specific locations within parking facilities and transported to the passenger terminal. Because of the light usage, however, the shuttle buses were able to follow the cars of departing passengers when they entered the parking facilities so that passenger pick-up would occur at the car, thus minimizing walking distance and baggage handling. The passengers were then transported directly to curbside. The same type of service was provided for arriving passengers.

Once business improved in the Park-N-Fly lots, operators found it was important to continue this car-to-curbside service. Park-N-Fly is currently operating six off-airport parking facilities and building three more.

Remote lots with prompt shuttle service offer the best kind of long-term parking service provided at large airports today. A comparison of remote parking with available garage parking at major airports, demonstrates the favorable rate structures and walking distances of remote facilities.

Regarding the applicability of valet parking, it is fine for departing passengers and for arriving passengers in the off-peak, but for arriving passengers during peak periods, considerable delay is incurred in waiting for the automobile to be brought to the valet pick-up point.

Private operations of remote parking facilities compete very favorably with remote parking facilities being operated by airport sponsors. Airport-operated remote parking is treated as an "economy" service and is tailored for low operating costs rather than convenience of the airline passenger. The emphasis generally is on maximum cost efficiency. As a result, shuttle frequencies are generally lower at airport-operated remote facilities than at privately operated facilities. Airport-operated facilities also require passengers to go to a pick-up point, and this requires walking within the lot. For these reasons, the airport-operated remote facilities have not been as well used as the privately operated facilities, even though the latter often charge higher rates. The customers appear to be prepared to pay a premium for quality service.

In summary, airport operators should consider planning for remote lots with first-class, service-oriented shuttle systems in lieu of additional close-in parking structures. The higher costs of better shuttle service can be recouped through the higher charges the airline passengers appear willing to pay.

PRESENTATION 3

James T. Murphy, Federal Aviation Administration, Washington, DC

Parking facilities at Dulles International Airport and Washington National Airport were briefly described. Dulles parking facilities are located in a single lot of 3,600 spaces. At National Airport, about 4,000 spaces are provided in 7 lots.

At Dulles, the biggest complaint of users is the service provided at parking exit booths. Dulles is unique because 40% of its passenger traffic occurs in 1-1/2 hours in the evening peak. Dulles parking facilities accommodate a number of long-term parkers (e.g., passengers on flights to Europe who park for durations of 2 to 3 weeks). Until recently, because of the peak exiting, there occasionally was a 40-minute wait at the parking lot exits.

At National Airport, 351 of the 4,000 spaces are devoted to short-term parking. These short-term spaces accommodate 46% of the cars, with a turnover rate of 12 to 15 times a day. The use of the parking space is controlled by pricing.

Computerized Revenue Control System at Dulles
An improved revenue control system was recently introduced at Dulles Airport and has increased revenues per enplaned passenger. Under the new computerized system, revenues have risen about \$200,000 per year. In addition, the new system has resulted in "no lost tickets."

The system operates as follows: Entering cars receive a ticket from a conventional ticket spitter. During nighttime hours, a license plate inventory is recorded and entered into the computer system. Upon the exit of a car from parking, the license plate number is punched into the computer system at the cashier's booth. Within an average of 15 seconds, the computer cross references the nighttime inventory to check if the ticket time corresponds with the inventory. Another advantage was that the new system leaves a "perfect audit trail."

The FAA strongly favors this new parking revenue control system, and workshop attendees were invited to visit Dulles Airport for an on-site inspection of the system.

PRESENTATION 4

Richard Hall, Peat, Marwick, Mitchell & Co., San Francisco

This presentation focused on the planning process for airport parking. Because of their size alone, airport parking facilities have an impact on all aspects of airport land use planning. Airport garages, like the one at O'Hare International Airport in Chicago, rank among the largest buildings in the nation, and surface parking at many airports is (or will be) measured in the tens of acres. For example, at Tampa International Airport, a lot of more than 10 acres is needed for overflow conditions just for holiday periods of the year.

The financial impacts of airport parking are also significant. Construction of structured parking costs several thousand dollars per space, whereas costs for shuttle bus service to remote surface parking--as at Houston Intercontinental Airport--are measured in the hundreds of thousands of dollars per year. Parking is a major contributor to airport revenues. Airport Operators Council International survey data for airports serving medium and large hubs indicate that annual parking revenues account for an average of about 20% of total gross revenues.

Three topics in the planning of public parking facilities were addressed:

1. Determining space requirements,
2. Environmental concerns, and
3. The need for more data and studies.

The discussion focused primarily on long-term parking where the traveler parks his vehicle for the trip duration. Long-term parking typically accounts for less than 10% of air passengers at an airport, but the vehicles typically occupy more than 50% of the total parking spaces in use.

Parking space requirements tend to grow in direct proportion to air passenger levels. As a result, parking requirements increase somewhat faster than other airport facilities requirements such as aircraft gates. Improved private or public transit service to airports has not yet had a significant effect in reducing automobile parking requirements.

However, the relationship of spaces versus passengers is qualified. The relationship refers to originating rather than enplaning passengers, and, in some instances, further detail is needed for planning purposes. At Tampa International, for example, peak space requirements for long-term parking do not necessarily occur in the peak of the tourist season. It is the resident air traveler, rather than the visitor, who contributes to the demand for long-term parking.

Air passenger traffic is growing rapidly because of discount fares and other factors, and this raises another point concerning parking spaces--a

shortage of capacity is apparent and frustrating to the user. An air passenger might accept a wait at the ticket counter, but not a "lot is full" notice for long-term parking. Consequently, at airports with parking capacity problems (as is currently the case at Kansas City and El Paso), the sponsor will hear about it . . . including unkind newspaper articles.

Regarding environmental concerns, resistance to the expansion of airport parking facilities by some state and community representatives was cited. Portland International (Oregon) and Dulles International Airports are examples. There is opposition to so-called "monuments to the automobile" because more airport parking appears to be inconsistent with community goals of increased transit to save fuel and improve air quality.

But placing limits on airport parking may not necessarily achieve environmental goals. If an air traveler cannot park at the airport for the trip duration and good commercial or public transit is not available, that traveler may choose to be dropped off and picked up at curbside by a family member. When this happens, automobile-miles traveled for airport access are doubled.

It also was stressed that localized air quality problems are a concern within and near garages. For example, Minneapolis-St. Paul International Airport has even undertaken wind-tunnel modeling of potential new airport parking facilities.

There is a real need for more data and further studies. To supply airport parking properly, it is first necessary to have a full understanding of demand. Because demand characteristics are different at each airport, hour-to-hour or day-by-day, information must be collected on:

1. Vehicle accumulations (spaces occupied),
2. Parking durations (lengths of time parked), and
3. Entrances/exits from parking (traffic volumes).

This information is typically obtained by computer processing of data from samples of processed parking tickets. "We, and other consultants, do our best to pick the best samples," Mr. Hall said, "but it would be desirable to have this information available on a routine basis at large airports. Capabilities of the new systems for parking revenue control (as discussed in the foregoing presentations) are encouraging in this respect."

Finally, there is a real need for comprehensive "before and after" case studies to improve the planning of airport parking (and to assist in "selling" these plans). Detailed activity measurements before and after a rate change, or before and after a new parking facility is opened, could address such fundamental planning questions as the following:

1. What differentials are necessary in parking rates to influence the use of various parking facilities at an airport? . . . particularly when different service characteristics are a factor (e.g., close-in versus remote parking facilities).
2. Does expansion of airport parking facilities cause changes in the mode of airport access?

Mr. Hall observed that the closest example of such a study was the Cleveland Hopkins Airport

Access Study in 1970, sponsored by the U.S. Department of Transportation. The study concerned airport access before and after rail transit was introduced, but even that detailed study did not fully describe parking impacts.

WORKSHOP MODERATOR'S COMMENTS

William M. Schoenfeld, Los Angeles Department of Airports, Los Angeles

When the new Los Angeles International Airport (LAX) terminal opened in 1961, 4,728 parking spaces were provided at a daily parking rate of \$2.00. Today more than 21,000 spaces are provided at LAX, at up to \$6.00 daily rates.

Lots	Spaces	Daily Rates
1 - 7 (Central Terminal)	6,214	\$6.00
A (Perimeter)	1,380	4.00
C (Perimeter)	5,343	2.00
VSP (Perimeter)	5,853	1.50
West Imperial Terminal	869	2.00/\$1 entry
Fly Away (Van Nuys Airport)	1,377	1.00 entry
	21,036	

To reduce curb space congestion, 264 metered spaces are now provided in the Central Terminal Area at LAX, with charges of \$.25 per half hour (with a one-hour maximum). The concept has been highly successful and additional meters will be installed.

The parking rate structure at LAX is designed to discourage long-term parking in the central terminal area, thereby making more space available for short-term parking. The current rapid growth in passenger activity may require another rate increase to shift more parkers to the underutilized perimeter facilities.

The perimeter lots (A, C, and VSP) have free tram service to and from the terminals. To increase the attractiveness of these facilities the Los Angeles Department of Airports recently purchased twenty new Argosy Airstream trams for some \$600,000 and negotiated an agreement with Airways Services, Inc. for tram operations and maintenance. The result has been a considerable upgrading of service.

Activity in the West Imperial Terminal Lot is highly seasonal. A cashier operation is used from May to October, and a dollar coin entry system is used during the slower months.

The FlyAway Lot, located some 25 miles from LAX, at the Van Nuys Airport, is actually a parking facility for LAX. High frequency bus transportation is provided between the FlyAway facility and LAX, subsidized by the Department at a rate which has decreased from \$2.45 to \$0.65 per passenger.

Statistics. Passenger activity at LAX grew from less than 10 million annual passengers (MAP) in 1963 to over 21 MAP in 1969. Various factors in the early 1970's slowed the growth rate; the 1975 total was 23.7 MAP. The growth since that time is as follows:

<u>Year</u>	<u>Passengers</u>	<u>Vehicles Parked</u>	<u>Gross Revenue</u>
1975	23,719,000	6,344,000	\$ 9,569,000
1976	25,983,000	6,639,000	10,878,000
1977	28,361,000	7,230,000	12,933,000
1978	*32,000,000	*8,000,000	*14,500,000

*Estimated

Parking Operating Agreements. A 1966 agreement requiring the parking operator to maintain the revenue control equipment, furnish signs, clean the lots, etc., was terminated in 1969 because the operator was unable to meet the lease requirements. Subsequent agreements from 1969 to 1977 clearly defined and limited the operator's responsibilities basically to furnishing cashiers, office personnel, and supplies. The Department assumed all other responsibilities. This concept was generally successful. A one-year contract was used with two one-year options on the part of the Department, and to avoid a "first year feast, last year famine" cycle, there were automatic percentage increases in the operator's compensation for the option years.

The Department finally discarded the traditional percentage of gross revenue bid item for a bid based on employee-hours worked in various categories. This concept eliminated what previously amounted to a conflict of interest for the operator built into the operating agreement. Under the former "percentage" approach, every additional hour an exit booth was kept open resulted in a reduction in the operator's profit. Under the current operating agreement, every additional hour an exit booth is kept open increases the operator's revenue.

Question and Answer Period

The audience was then invited to address questions to the panel. The following questions and answers were recorded:

1. James Gehring of Charleston:

- a. Question to Mr. Roth: Why retain a major parking operator at an individual airport when the experienced personnel brought in from "headquarters" seem to pass off management responsibilities to local people as soon as possible?
Answer: APCOA finds it very desirable to use local people for continuity and political reasons. APCOA's approach is to have experienced parking lot operator management personnel organize and train staff on-site for the first few months of operation, and then to provide management resources and checkups on a periodic basis.
- b. Question for Mr. Murphy: Does Metropolitan Washington Airports operate its airport parking facilities?
Answer: No.
- c. Question to Mr. Hall: Does your consulting firm make recommendations on the type of operation?
Answer: Yes. The pros and cons of various ways of operating an airport parking lot

for the particular case at hand are thoroughly examined. One reason for retaining a professional parking lot operator is to avoid civil service problems with firing personnel if questionable behavior is observed.

2. William Goodman, Airports International Magazine:

- a. Question to Mr. Roth: What percentage of parking lot gross revenues goes to the airport? If this percentage were decreased, wouldn't it be possible to hire personnel of higher quality in the parking lot facilities?

Answer: On the average, some 79 to 80% of gross from APCOA lots flows to the airport sponsors, including amounts for minimum guarantees. However, the actual level varies with the value of business. Better people could be provided if the percentage were decreased. About half of APCOA's contracts have been obtained by direct negotiations with airport sponsors and the other half by bid. Roughly 50% of the airports are concerned with the quality of service standards; the other 50% are concerned with revenue potential.

3. Question by (name unrecorded): Has anyone invented a mechanical or electrical signing system pointing out where individual spaces are available within a parking facility?

Answer: Mr. Bloom stated that Park-N-Fly maintains signs at the lot entrances which point out the areas where spaces are available. Park-N-Fly equips its circulating vehicles with radios to report available spaces. This information is displayed at the lot entrance.

Mr. Hall said that such a system would require electromechanical detection on a space-by-space basis and these detection systems have not yet proved to be fully reliable. He noted the frustration of parkers when the sign reads "parking lot full" but empty spaces can be seen.

4. Comment by Arthur Goldberg, R. Dixon Speas Associates: Parking is only one element of the total traffic management analysis that should be addressed at airports. There is often a problem of congestion on circulation roads and at the curb. Perhaps another session of the AOCI Workshop could be planned to cover traffic engineering and circulation questions.
5. Comment by Lawrence Donoghue of Ralph Burke Associates: In my studies, the road system and the parking lot are considered together; they are inseparable.
6. Comment (name unrecorded): To permit future terminal, curb, or roadway expansion, it is important not to locate parking structures too close to the terminal building.

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