

Automated Parking: Two-Year Report Card

By Gerhard Haag and Larry Byrnes

In the January/February 2003 issue, PARKING magazine introduced you to the nation's first fully-automated parking garage that opened in Hoboken, New Jersey. Now, almost two years later, let's take a look at some of the data from the structure's feasibility study compared to actual operating statistics, and examine how this new technology is assimilating into our culture.

Feasibility Study

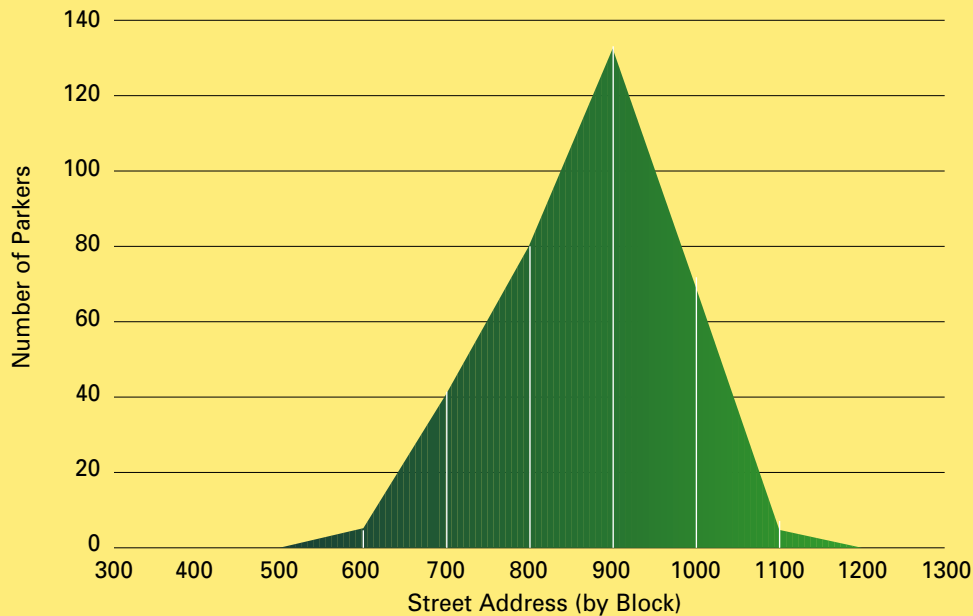
The feasibility study for the Garden Street Garage, conducted by Consulting Engineers Group (CEG), states, "The parking fee of \$200 per month is considered a genuine bargain," due to amenities such as, "ultimate security for cars and patrons; no valets driving the cars; and 24-hour service, 7 days a week." As a result, the study "strongly recommended" the adoption of the proposed \$200 per month parking fee.

In regard to operating costs, the study states, "The operating cost of \$1,200 per space, per year is in the low range when compared to other similar garage operations [that] have full valet service and a completely closed facade." The study also projected a higher operating expense than what actually exists: The maintenance and operation fee paid to Robotic Parking is approximately 12% less per year than the estimated projection.

Master Plan

The Garden Street Parking Facility fits very well within the City of Hoboken's master plan, which indicates that similar facilities are desired; supports the construction of remote parking facilities in areas not located near existing public parking garages; and which supports the creation of additional resident off-street parking through public/private partnerships. The Garden Street Automated Parking Garage is the city's solution to these objectives, accommodating approximately the same number of cars as nine blocks of on-street parking

Figure 1. Distribution of Patrons at 916 Garden Street Garage



in a space equivalent to four brownstones, and blending in with neighboring homes.

The garage has enabled the city to provide parking for the residents of Hoboken very close to their homes, and in a relatively small structure rather than a large parking structure on the edge of a residential area. A study of the addresses of garage patrons shows that the majority of the users live in the immediate neighborhood (see Figure 1).

The Technology

The modular system of the garage provides for a variety of possibilities in terms of the arrangement of different machinery components. Since the motions of the three axes—x, y, and z—are performed by independent machinery, it allows for a combination of such and, therefore, the adjustment of the necessary peak traffic (PT) handling of a specific location. Figure 2 shows the relationship of installed components and concurrent capacities of handling certain numbers of cars per hour.

Although the Garden Street Facility is equipped with only 2 lifts and 4 entry/exit stations, the peak traffic handling capacity is for 110 vehicles per hour, which is deter-

mined by the number of installed lifts.

Figure 3 shows the actual measured time for retrieving vehicles for patrons arriving at the very same moment in the lobby.

A very important impact of PT handling of an automated parking facility is the dwell time (DT) of patrons—this is the actual

Figure 2. Relationship of Components and Capacities

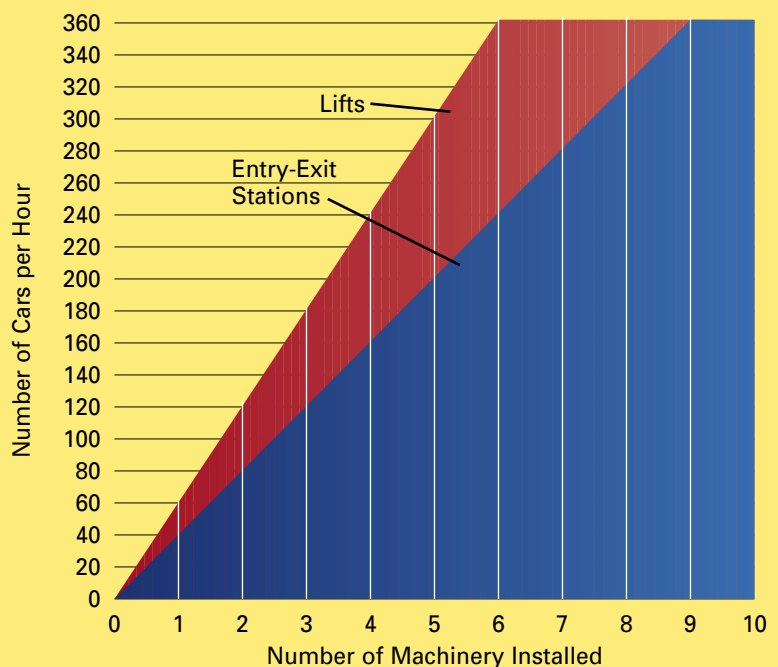
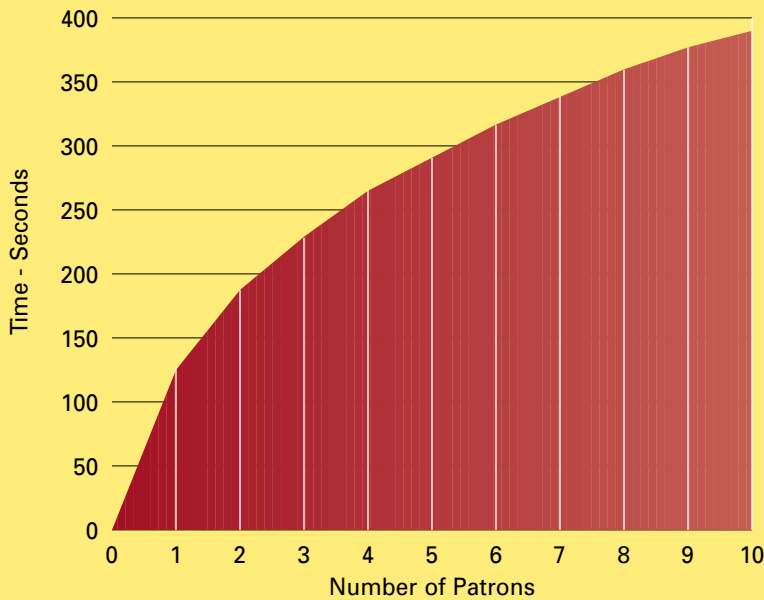


Figure 3. Actual Measured Time for Patrons Simultaneously Requesting Car



time it takes the patrons to drive their cars into the entry/exit stations (EES) for the storage process. DT is measured from the moment the EES door opens, until the patron has positioned his or her car and is out of the EES to initiate the storage process for the car by either swiping a card, pushing a button, or entering a PIN number on a touch screen.

Experience shows that the DT for storage

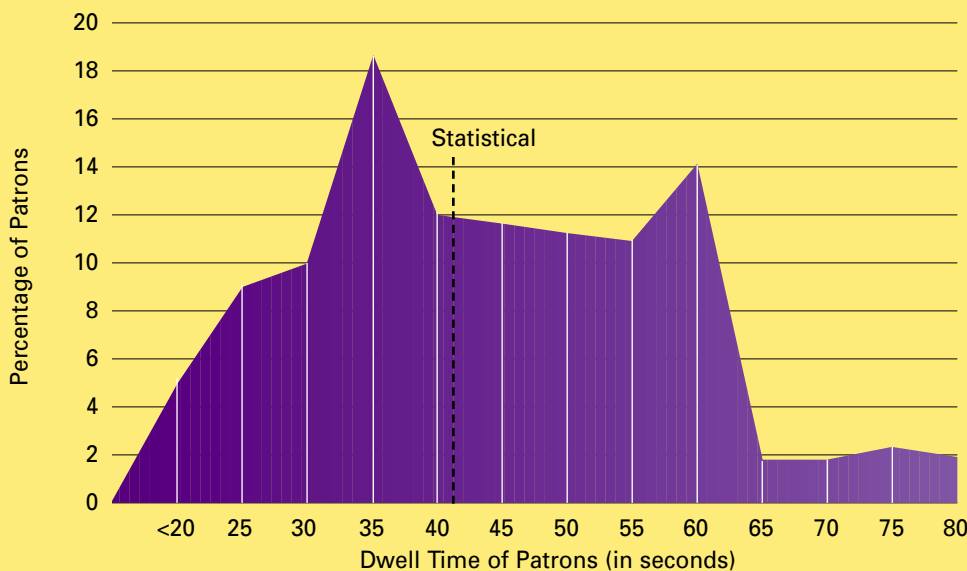
is a critical component in achieving peak traffic performance. The DT at the retrieval portion of the parking procedure is “de minimise” compared to the storage DT. Figure 4 illustrates the actual DT measurements during Garden Street’s first six months of operation. (These DT figures have since decreased about 10% to 20%, thus creating a “cushion” for planning purposes of peak traffic.)

Figure 4 shows the importance of the dwell time compared to the machine time (MT); both added together create the storage time (ST) per vehicle parking. MT is the time it takes to replenish the same EES for the next vehicle to enter after the previous patron has initiated the storage process. Depending on the installed machinery components, the MT ranges from 40 to 50 seconds. Thus, it is very clear that the impact of the DT to the overall PT handling of an automated parking system can be significant. Therefore, measures installed in the EES area to enable patrons to position

their vehicles faster is a very important factor in the design of an automated parking facility.

For demonstration purposes, using the average DT of 40 seconds, and an average MT of 50 seconds, translates into a 90 second storage cycle time per EES, which results in $3,600 \text{ s} / 90 \text{ sec} = 40 \text{ vehicles} / \text{EES} / \text{hr}$. Having installed 4 EES, this will result in a PT handling of $4 \times 40 = 160 \text{ vehicles per hour}$ through the EES.

Figure 4. Patron Dwell Time



Patron Feedback


Patron Satisfaction

The real test of the success of the garage comes from the patrons. Frequent surveys show approval rates of the garage in the 93% to 98% range in every category:

- 97.8% rate the service as very good to exceptional.
- 95.1% rate the security of the vehicles very good to exceptional.
- 94.9% feel very good to exceptional when entering and exiting the garage.
- 93.4% rate the convenience as very good to exceptional.

What's Next?

In the February 2004 issue of *AAA World*, the magazine of the American Automobile Association, writer Allison Brunner posits, "We're a country always on the forefront of technology. Why then, has it taken us so long to catch on to automated parking garages?"

Robotic Parking Systems has answered with four signed contracts for the construction of new automated parking facilities totaling over 1,000 automated parking spaces. These facilities are contracted on the West Coast, the East Coast, and in the South. Robotic Parking Chairman of the Board Juergen Bauer comments, "This is the appropriate response of the market to this emerging and amazing technology, and a recognition by developers to better maximize capacity by providing a smart parking enhancement to projects." 

Gerhard Haag is the founder and principal owner of Robotic Parking Systems. Larry Byrnes is the founder of Competence Software, and a member of the Board of Directors for Robotic Parking Systems

Ellen:

After 12 years of parking on the street in Hoboken, 12 years of utter and complete frustration, 12 years of scheduling my life around the parking situation, the garage at 916 Garden Street opened. Just half a block from my house, I jumped at the opportunity to enroll. The fact that I now have a safe and secure place to park my car has changed my life.

The garage is not only convenient to my house, it is safe. I never find myself late at night walking through a parking structure or in some dark staircase. The garage is well maintained—they even have a television in the lobby!

David:

Two years ago, my fiancée and I finally moved in together. Our apartment was great, but we had nowhere to park the car. Little did I realize how tough this problem is in Hoboken. Then, the closest parking facility was located 7 long blocks away, which meant that every time we wanted to unload the car coming back from the supermarket or the beach, we had quite a hike ahead of us. This was especially unpleasant during inclement weather.

We were faced with two options: Either move (again) to a new location, or suffer. I have two small children, and, as any parent knows, children are not fond of walking, especially when tired, or cranky, or both. But sometimes—just sometimes—there is a third option. A new parking facility opened, just across the street from us. Did I mention how quickly we signed up? Not only were Robotic Parking rates competitive, but the facility is by far superior to any other parking place I have ever seen.

It is completely automatic. We park our car in a bay, and computerized ramps deliver the car into the parking lot. We can, and do, leave valuables in the car (such as spare change, CD players, etc.). The car comes back to us exactly the way we left it. If that wasn't good enough, we park the car head in, but get it back head out—no driving in reverse!

Amy:

My experiences over the past 700 days have been excellent! It makes living in Hoboken infinitely better. If I compare life before using the garage and now, I would you say the quality of life has improved dramatically. So did our property value—it's a great selling point!