HOT Lanes on Interstate 15 in San Diego: Technology, Impacts and Equity Issues

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Abstract

This paper reports on selected aspects of the world-first implementation of the dynamic pricing system on the busy urban freeway I-15 in San Diego, California. In December 1996, the underutilized 8-mile-long HOV lanes, located in the median of I-15, were converted into a High Occupancy Toll (HOT) facility that allowed solo drivers to use it for a fee. The fee is dynamically adjusted in order to maintain the state-mandated LOS C there. The carpoolers with occupancy 2+ can still use the facility for free.

The author of this paper was a leader of a team of researchers responsible for a 4-year-long comprehensive assessment of that FHWA-sponsored federal demonstration. The study compared two versions of the I-15 pricing: the original ExpressPass version that used a fixed monthly fee for unlimited use of the facility, and the current FasTrak system that charges variable fees for each use of the facility. The monitoring and assessment project included traffic-related issues, behavioral issues as well as equity and environmental impacts issues. By most standards, the San Diego dynamic pricing project proved successful in meeting its major objectives.

This paper focuses on the following issues: 1) technological aspect of ExpressPass and FasTrak operations; 2) issues related to the program costs and revenues; 3) perceived fairness of the program; 4) issues of equity, accessibility and outreach efforts related to the required environmental justice compliance; 5) major traffic-related impacts affecting program participants, I-15 carpoolers, and main-lane solo drivers; 6) importance of political champion, institutional cooperation, and proper media relations; and 7) general comments concerning potential international transferability of the San Diego positive pricing results.

1. INTRODUCTION

The High Occupancy Toll (HOT) lanes on Interstate 15 (I-15) in San Diego are still (as of late January 2005) the sole implementation of "dynamic congestion pricing" in an urban freeway anywhere in the world. Success of this project is best evidenced by the fact that it has been extended indefinitely, beyond the originally scheduled 3-year-long operation until the end of 1999. This paper examines the main reasons why this success was possible.

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Interstate 15 is a very busy major inland freeway in San Diego county connecting growing bedroom communities in the north with major employment centers in the south. This freeway is a major commuter route for those employed in downtown San Diego. Also, travelers rushing toward San Diego airport are using I-15.

A reversible High Occupancy Vehicle (HOV) lane facility was completed in December 1988 as a separate roadway in the median of the freeway on an 8-mile section of I-15 between SR163 and SR56. The hours of operation for these express lanes are from 5:45 am to 11:00 am in the southbound direction and from 12:00 pm to 7:00 pm in the northbound direction. Recently, the Express Lanes have also been used to carry the growing weekend traffic. Figure 1 presents the specific location of the I-15 Express Lanes where the FasTrak dynamic congestion pricing system is introduced.

Since its opening in 1988, the HOV facility has been operating under capacity. Prompted by a desire to make better use of the existing HOV lane capacity, and to generate revenue for transit service improvements in the corridor, San Diego Association of Governments (SANDAG), responded to the initiative of Mr. Jan Goldsmith, Mayor of the City of Poway, and proposed the high occupancy toll (HOT) lane demonstration project called the Interstate 15 Congestion Pricing & Transit Development program. The four primary purposes of the project were to: 1) to maximize the use of the existing capacity on the HOV lanes, 2) to use congesting pricing to fund transit services throughout the corridor, 3) to test whether congestion pricing can help relieve congestion on the main lines, 4) to use a market-based approach to set tolls.

A three-year monitoring and evaluation of this project was assigned to a team of researchers lead by the author of this paper. The project consisted of two phases. The first phase was initiated in December 1996 under the term Phase I I-15 ExpressPass. Under the ExpressPass program, a limited number of solo drivers paid a flat monthly fee, which was $50 per month at first and was raised to $70 per month, for unlimited use of the lanes.

Phase II (or Full Implementation) began in the late March 1998. The program was changed to Phase II I-15 FasTrak, which allows solo drivers to pay a per trip fee to use the lanes. The fees are adjusted dynamically based on traffic levels in the I-15 Express lanes as well as time of day. To sign up for the program, a prepaid account is required. Each time a Fastrak subscriber uses the facility, the price is automatically deducted from his/her account.

During the evaluation of the project, SDSU collected data, conducted statistical analyses and published a series of reports in 12 areas of interest to the assessment study, summarized in [1], [2], and [3]. Two major studies were: 1) Traffic Study, presenting system-wide traffic related impacts of the project [4], and 2) Attitudinal Panel Study, presenting results of a longitudinal phone survey that studied travel behavior, perceptions and attitudes of individuals affected by the project [5]. Studies were conducted in regular time intervals (waves).

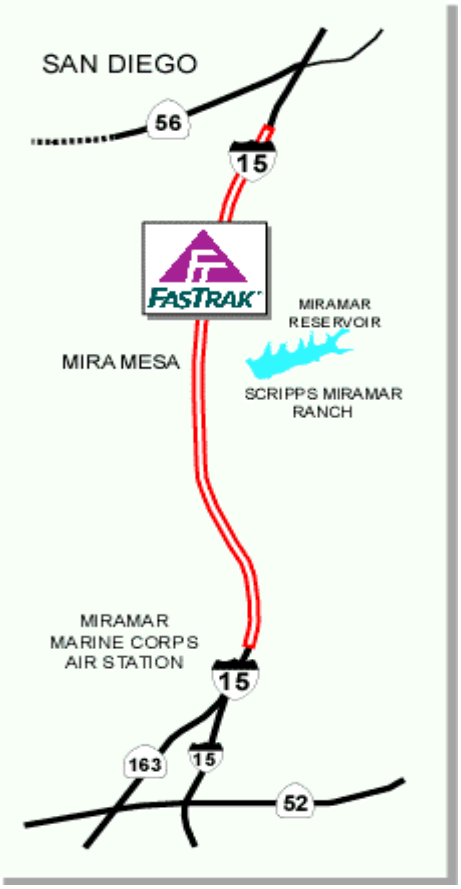


Figure 1. Project Location

An 8-mile freeway section on I-8 was used as a control corridor to sort out project-related and non-related impacts.

2. TECHNOLOGICAL ASPECT OF EXPRESSPASS AND FASTRAK OPERATIONS

Under the ExpressPass operation scenario, the technology of the program operation was very simple. In order to distinguish between the legitimate participants and potential violators, program participants received a colored permit to be attached to their vehicle windshield for enforcement purposes. Since the prepaid monthly fee guaranteed an unlimited use of the facility, there was no need for any technology that would address fee variations throughout the length of the peak period.

The FasTrak operation was much more demanding. The state-mandated Level of Service (LOS) C was to be maintained at the facility at all times. Any time LOS C was about to be threatened as recognized by the loop detectors installed in the pavement, a system computer was set to increase the fee for using the system. Fee adjustments could be made every 6 minutes and displayed at the FasTrak toll signs. The system algorithm was set as to always benefit the user: if the price went up just after subscriber saw it, the original, lower fee was charged. However, if the price went down just after the user passed the toll sign, the lower fee was charged.

Another challenge was related to the Electronic Toll Collection (ETC) system. While the carpoolers use the facility for free, the FasTrak subscribers' transponders have to be recognized by the antennas installed in the overhead gantries to collect a proper fee at each use of the facility. Originally, the toll zone had an extra third lane for FasTrak subscribers, with the regular two lanes left for carpoolers, see Figure 2.

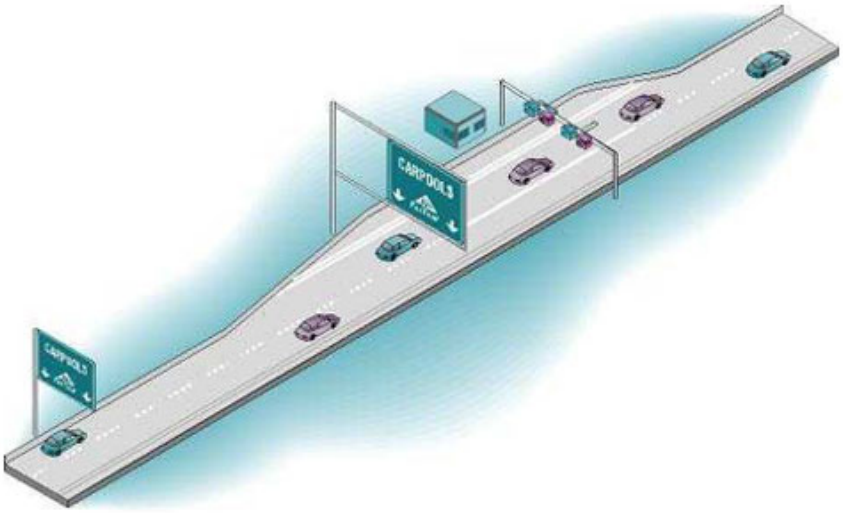


Figure 2.
The Early Version of the ETC System on I-15 Express Lanes in San Diego

This way, enforcement of the system was easier. However, such an arrangement created inconvenience and safety hazard for FasTrak subscribers, as they needed to re-merge into the original two-lane alignment soon after they passed the toll zone. Eventually, the third lane was eliminated, leaving a consistent two-lane cross-section throughout the 8-mile-long facility.

The technology of FasTrak proved to be reliable and problem-free. With the exception of the initial few days of its operation, the system has been working very well. The dynamic pricing mechanism assured enforcement of the required LOS C in over 99% of time periods studied.

3. SYSTEM COSTS AND BENEFITS

Implementation of the Congestion (Value) Pricing Project on I-15 in San Diego was possible after it was accepted in January 1995 as one of the ISTEA Congestion Pricing Pilot demonstrations. As a result, a $7.96 million grant came from FHWA for project implementation. An additional $230,000 grant came from FTA. The required 20% matching fund of $1.99 million was obtained locally in San Diego.

State legislation required that all revenues guaranteed from the users' fees are used for transit improvements in the I-15 corridor. Consequently, a new express bus service, named Inland Breeze, was funded from the project revenues and continues to improve transportation accessibility and service along the I-15 corridor.

Better utilization of the Express Lane facility and congestion relief on the main lanes brought significant reduction of the overall cost of delay calculated for all users of the I-15 corridor. Even without considering other project benefits (e.g. air quality); the cost of delay reduction alone was large enough to justify the original capital investment into the project. All benefit/cost analyses proved that the I-15 FasTrak project's benefits outnumbered its costs in any 20-year analysis scenario.

4. PREFERENCE FOR USE OF PROGRAM REVENUES

Attitudinal Panel study was undertaken in five waves to gather information about perceptions, attitudes, and individual behaviors of program users and non-users. Interestingly, the vast majority of respondents did not know how the program revenues were spent. Their perceptions about this issue varied widely, even in the fifth (and last) wave of the panel study, see Table 1.

Table 1. Respondents Perception of Program Revenues Use - Wave 5

	FasTrak Customers		Other I-15 User		I-8 Users	
Improve/maintain I-15 regular lanes	37	(12%)	39	(16%)	22	(11%)
Adding more I-15 regular lanes	4	(1%)	6	(2%)	3	(2%)
Improve/maintain I-15 carpool lanes	62	(21%)	59	(24%)	18	(9%)
Add more or extend I-15 carpool lanes	17	(6%)	17	(7%)	9	(5%)
I-15 Inland Breeze express bus service	103	(34%)	17	(7%)	0	(0%)
Other I-15 express bus service	36	(12%)	6	(2%)	1	(1%)
Improve/maintain all SD freeways	41	(14%)	58	(24%)	60	(31%)
Adding more regular lanes on all SD freeways	10	(3%)	12	(5%)	6	(3%)
Adding carpool lanes on other SD freeways	2	(1%)	4	(2%)	6	(3%)
Other	122	(41%)	106	(43%)	91	(47%)
Segment Totals	**300**	**(100%)**	**245**	**(100%)**	**192**	**(100%)**

Across all study waves, very few respondents knew that the money collected from the project was actually spent on the new I-15 express bus service named Inland Breeze. The actual share of those who knew that for the fact increased between Wave 1 and Wave 5 from 26% to 34% for the program participants and from 4% to 7% for the other I-15 users. When respondents were asked their preference about use of the program revenues, they did not favor the transit improvements on I-15, seeing more value in other ways to spend those funds, see Table 2. Across all study waves, support for spending the project revenues on Inland Breeze bus service was very low: it varied between 4% and 9% for the FasTrak subscribers and between 0% and 2% for all other I-15 users.

Table 2. Respondents' Preference Concerning the Use of Program Revenues - Wave 5

	FasTrak Customers	Other I-15 Users	I-8 Users
Improve/maintain I-15 regular lanes	78 (18%)	93 (18%)	52 (12%)
Adding more I-15 regular lanes	40 (9%)	65 (12%)	16 (3%)
Improve/maintain I-15 carpool lanes	93 (21%)	102 (19%)	38 (9%)
Add more or extend I-15 carpool lanes	101 (23%)	85 (16%)	31 (7%)
I-15 Inland Breeze express bus service	40 (9%)	9 (2%)	0 (0%)
Other I-15 express bus service	15 (3%)	12 (2%)	1 (0%)
Improve/maintain all SD freeways	70 (16%)	87 (17%)	139 (32%)
Adding more regular lanes on all SD freeways	23 (5%)	25 (5%)	37 (8%)
Adding carpool lanes on other SD freeways	15 (3%)	19 (4%)	27 (6%)
Other	206 (46%)	259 (49%)	215 (49%)
Segment Totals	**441 (100%)**	**427 (100%)**	**437 (100%)**

This last finding is quite interesting, as the transit improvement was the main original reason for the I-15 Value Pricing project.

5. PERCEIVED FAIRNESS OF THE PROJECT

In compliance with the Environmental Justice requirements, introduced by President Clinton in 1996, the I-15 Congestion Pricing project needed feedback from the low income/minority segments of the affected public. San Diego Association of Governments (SANDAG), an agency that managed day-to-day operations, organized the required public hearings before the ExpressPass phase and again before the FasTrak phase of the project. Despite broad announcements in the media, all meetings were poorly attended (one even ended with nobody from the public showing up), clearly indicating that the project was commonly perceived as non-controversial, and not unfair to any of the constituent group. This is in sharp contrast to several other projects or political initiatives that brought heated discussions in San Diego (Fall 2004 mayoral election could be a good example of that).

It is worth mentioning that not all issues related to the project were so non-controversial: the original group of ExpressPass subscribers showed great sensitivity to the intended fee

increases for their ExpressPass permit. The starting fee in December 1996 was intentionally set at the low level of $50 per month, with the intention to increase that fee several times to study price elasticities and to gradually bring the fee level to some more justifiable level, well above the initial $50 a month. However, the subscribers sent several letters protesting even the very first fee increase to $70/month. After implementing the $70 fee, SANDAG attempted a further increase of the fee to $80/month. That intended change was met with dozens of protesting letters from subscribers and SANDAG Board of Directors decided not to implement the $80/month fee. The relatively low $70 fee was in place until March 1998 when the ExpressPass system was replaced with the FasTrak per-trip fee system.

The overall perceived fairness of both the ExpressPass and FasTrak versions of the I-15 project was confirmed by the Attitudinal Panel study findings. Table 3 shows that the vast majority of I-15 corridor users perceived the project as fair (data for the Fastrak version).

Table 3. Perceived Fairness of the I-15 Congestion (Value) Pricing Project (Wave5)

	FasTrak Users		FasTrak Non-Users		I-15 Solo Drivers		I-15 Carpoolers	
Fair	245	(96%)	97	(90%)	178	(74%)	68	(70%)
Unfair	8	(3%)	7	(7%)	53	(22%)	27	(28%)
No opinion	3	(1%)	4	(4%)	11	(5%)	3	(3%)
Segment totals	**256**	**(100%)**	**108**	**(100%)**	**242**	**(100%)**	**98**	**(100%)**

6. OTHER PERCEPTIONS CONCERNING THE PROJECT

Key findings support the view that in the I-15 corridor, the use of congestion pricing to better utilize the Express Lanes is a policy that has received considerable support. Several factors, one of which appears to be a lack of significant negative impacts, are likely to play a role in explaining the positive support for the project [5].

The use of ExpressPass/FasTrak was purely voluntary. Program participants saved time by using the Express Lanes. The most cited reason to join the program was the need for on-time arrival. ExpressPass/FasTrak customer's perceptions of time savings were in the 20-minute range (which agrees with actual measurements) and they were convinced that the program positively impacted their travel time. The great majority of all other travelers reported no negative impacts of the program.

ExpressPass/FasTrak users, as well as I-15 carpoolers continuously perceived traffic conditions in the I-15 Express Lanes as satisfactory. This is a particularly important finding, as it shows that the policy of adjusting prices to traffic levels in the lanes has been successful in maintaining the level of service.

A vast majority of program participants and an increasing fraction of I-15 carpoolers considered the project a success. I-15 solo drivers (users of the main lanes) were split on this issue; they nevertheless supported the principle of charging solo drivers for the use of the Express Lanes.

Most FasTrak customers strongly agreed that the program was effective in reducing congestion, and the majority of other I-15 users also agreed but less strongly.

Support for the pricing policy continued throughout the project. The majority of customers were satisfied with dynamic per-trip pricing, and this preference increased during the project.

Furthermore, the majority of all I-15 respondents favored increasing the per-trip charge over other solutions to prevent the Express Lanes from becoming too crowded. Also, over the entire study period, the majority of program participants themselves, not employers, paid for FasTrak.

7. MAJOR TRAFFIC-RELATED IMPACTS

7.1 Transit Improvements in I-15 Corridor

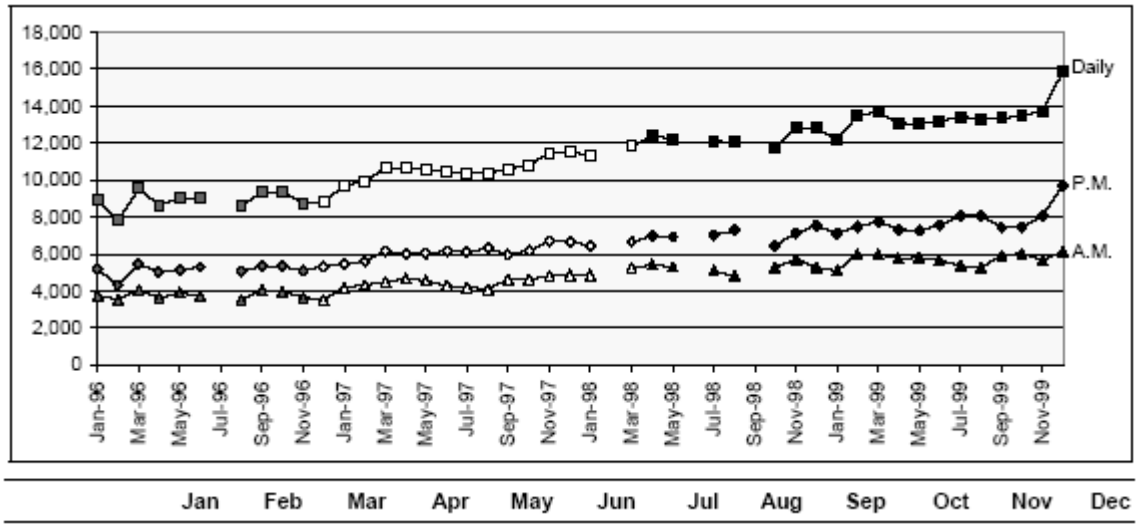
At the end of the three-year evaluation, the I-15 pricing project appeared to have met most of its primary objectives. Both ExpressPass and FasTrak were feasible solutions, which generated sufficient revenue to fund transit service improvements in the I-15 corridor.

The revenue raised was successful in funding the new express bus service called Inland Breeze that improved transit in the I-15 corridor as fulfillment of one of the project's major goals. The high proportion of Inland Breeze riders dependent on public transit for their travel, however, suggests that the service was primarily reaching segments of the population with traditionally higher levels of bus ridership.

7.2 Volume Increase on the I-15 Express Lanes

As the project progressed, utilization of the Express Lanes was steadily improving. Figure 3 shows the increase in volumes on the facility over the project duration.

Figure 3. Average Peak Period Volumes on I-15 Express Lanes, 1996 through 1999



A formal statistical assessment of Express Lane volumes involves the conceptual model:

$$\text{Express Lane Volume} = \text{Constant} + \text{Trend} + \text{Phase Effect} + \text{Phase} \times \text{Trend Effect}. \quad (1)$$

Results of the regression analyses are summarized in Table 4. Because the TMC data include all three phases, tests for the significance of model terms are most conveniently expressed in terms of F-statistics and corresponding p-values.

Each regression analysis involves the assumption that the random variations in volume from month to month are not serially correlated—that is, a month with higher than expected volume does not tend to be followed by another month with higher or lower than expected volume. This assumption was checked using the Durbin-Watson test finding no evidence for serial correlation.

Table 4. Regression Trend Analysis for I-15 Express Lanes Peak Period Volumes

Period	Phase F-statistic	Phase p-value	Trend F-statistic	Trend p-value	Phase x Trend F-statistic	Phase x Trend p-value
a.m.	1.716	0.193	12.529	0.001	2.135	0.132
p.m.	0.446	0.644	17.923	<0.001	0.753	0.478
a.m. + p.m.	0.923	0.406	26.738	<0.001	1.812	0.177

The results in Table 4 clearly confirm the statistical significance of the increasing trend in total volume on the I-15 Express Lanes during both the a.m. and p.m. peak periods. The phase × trend effects are not significant, indicating that the rate of increase was constant over all three phases. This can be explained by the fact that new ExpressPass permits and FasTrak transponders were ordered and issued to subscribers gradually over time to meet increasing demand. Also, the lack of significant phase effects suggests that transitions from one phase to another caused no lasting one-time shifts in total Express Lane volume. The combined monthly increase in volume on the Express Lanes was 125 vehicles per month.

7.3 Increase in Carpool Volumes

It is important to emphasize that the volume increase on the Express Lanes was caused not only by the increase in program participants, but also by increase in carpool volumes.

Contrary to some pre-project expectations, neither ExpressPass nor FasTrak negatively affected carpool volumes on the Express Lanes. There were substantial increases in HOV volumes during ExpressPass that declined somewhat during FasTrak, but were still higher (by at least 13%) than in the pre-project period. Importantly, as shown in Table 3, majority of I-15 carpoolers (70%) considered the I-15 Pricing project as fair, despite the fact that after the project implementation, they lost their monopoly for the use of the Express Lanes.

7.4 Time-of-Peak Redistribution of the Express Lanes Volumes

FasTrak was primarily responsible for the continued increase in total Express Lane volume. Most importantly, FasTrak, in contrast to ExpressPass, was able to redistribute volumes from the middle of the peak to the peak shoulders. Despite steadily increasing Express Lanes volumes, LOS C conditions, as required by law, were maintained at virtually all times, see Figure 4.

Figure 4. Time-of-Peak Distribution of Express Lanes Volumes

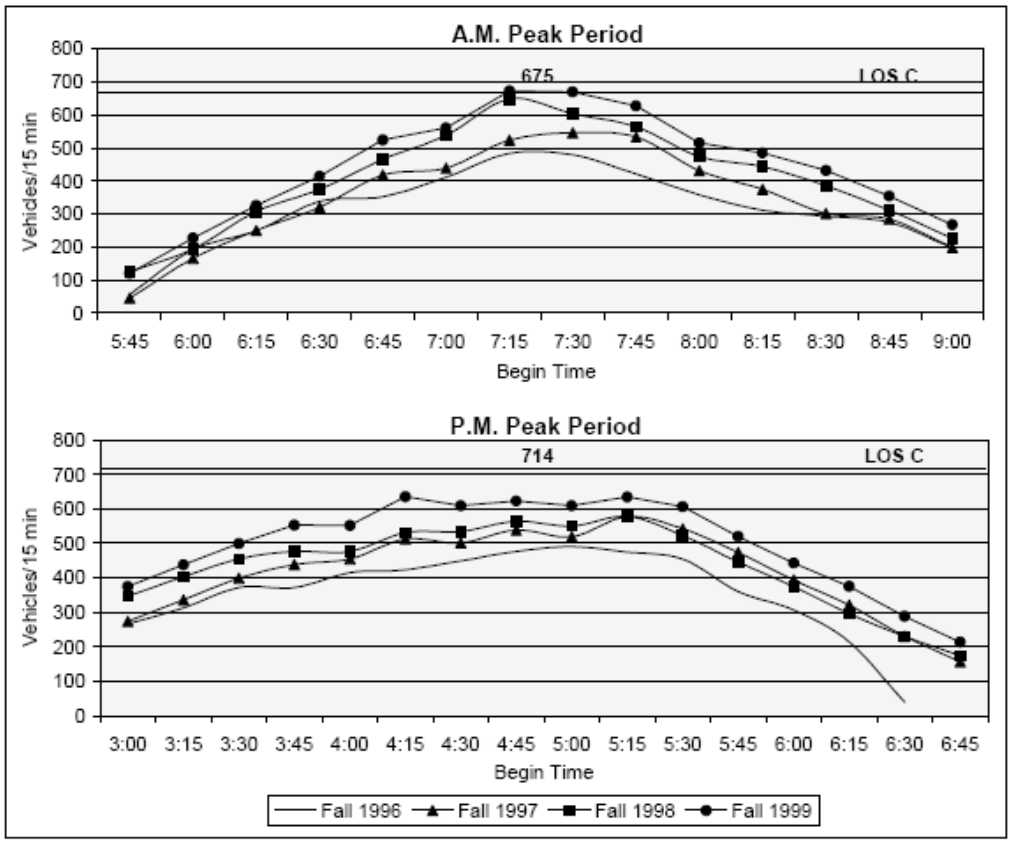


Table 5 presents changes in Peak Period Distribution Factor (PPDF) over the length of the project. PPDF is defined as a ratio of the variance of the volume distribution throughout the peak period to the variance of the corresponding uniform distribution. The results in Table 5 confirm the displays from Figure 4 that the variance of volume distribution was greater during the p.m. peak period than during the a.m. peak period. Variances of volume distribution appear slightly higher in Spring than in Fall.

The drop in variance from Fall 1996 to Fall 1997 in the a.m. peak period and the subsequent general increasing trend in the variance of peak period volume distributions in both a.m. and p.m. peak periods is consistent with two key interpretations of these findings: 1) the fixed monthly fee structure of ExpressPass was encouraging the undesirable use of the program during the middle of the peak period, and 2) the dynamic FasTrak fee structure was able to create desirable redistribution of the portion of Express Lanes traffic from the middle of the peak to the shoulders.

7.5 Traffic Relief on the Main Lanes of I-15: A Short-Lived Gain

Another positive effect of the project is the apparent ability of the project to alleviate congestion on the I-15 main lanes. Average peak period volumes on those lanes generally decreased slightly, though not significantly in the first year of the project only. Traffic relief on main lanes did not continue beyond Year 1 primarily because of very fast growth of the

bedroom communities along I-15 generating additional traffic. Overall volumes in the I-15 corridor increased moderately and were slightly lower than volume increases along the I-8 control corridor.

Table 5. Statistical Assessment of Changes in PPDF Values, Total Express Lanes Volumes, 1996 through 1999

		PPDF	Changes in Percent	F-value	d-o-f[1]	d-o-f[2]	p-value	Significant at the α = 0.05 level?
A.M. Peak Period								
Spring	1997	60.9%						
	1998	68.2%	12.0%					
	1999	69.4%	1.8%					
	1997 through 1999		14.0%	11.547	2	15,405	<0.001	yes
P.M. Peak Period								
Spring	1997	75.1%						
	1998	80.1%	6.7%					
	1999	80.3%	0.2%					
	1997 through 1999		6.9%	52.235	2	20,940	<0.001	yes

7.6 Reliability of the On-Time Arrival Using HOT Lanes

An important project benefit is the reliability of reduction in travel time delay. Under worst congestion conditions, FasTrak users can save up to 20 minutes avoiding delay on the I-15 main lanes and on the on-ramp to the main lanes. For example travelers living in Rancho Peñasquitos, an area located in close proximity to the north entrance of the I-15 Express Lanes, constitute potential FasTrak customers. For these travelers, two components of the perceived travel time totals could apply: (1) the necessity to experience delay on the on-ramps to southbound I-15 and (2) the actual delay while traveling southbound on the I-15 main lanes. Both delay components could be avoided or greatly reduced by using FasTrak. Therefore, the SDSU study team decided to conduct a ramp delay study to analyze both components separately in the final evaluation year.

Participants perceived reliability of on-time arrival as the most important benefit of FasTrak. Thus, it is of interest to find out the extra time that needed to be added to "optimal" travel time to assure a reasonable frequency of on-time arrival. Ramp delays and freeway (main lanes) delays are interrelated as ramp metering depends on the congestion level on the main lanes, and in the worst-case scenario, travelers would have to account for both components of the delay to be present on any given day.

Table 6 summarizes the results of the delay studies and shows the maximum total delay (ramp delay and freeway delay) that an I-15 commuter can expect to experience approximately twice a year (t_{99}) when using the I-15 main lanes. Table 6 also compares the total delay to the time needed to travel the respective section of the I-15 main lanes (5.97 miles) under free-flow condition (65 mph).

Table 6. Total Freeway and Ramp Delay Calculated for the I-15 Main Lanes

		Ramp Waiting Time (t_{99})	Freeway Travel Time (t_{99})	Total Travel Time (t_{99})	Free-flow Travel Time	Total Delay Time
Spring	Mon-Thu	11.8 min	8.4 min	20.2 min	5.51 min	14.7 min
	Fri	5.3 min	5.7 min	11.0 min	5.51 min	5.5 min
Fall	Mon-Thu	16.3 min	9.4 min	25.7 min	5.51 min	20.2 min
	Fri	4.9 min	8.5 min	13.4 min	5.51 min	7.9 min

The results presented provide an important confirmation of the fact that travelers think about travel times in terms of reliability of on-time arrival rather than in terms of average delay only. Interestingly, the program participants responding to the Attitudinal Panel survey listed travel time reliability as a primary benefit of either the ExpressPass or the FasTrak version of the I-15 pricing project. The maximum delay reduction of about 20 minutes is consistent for both Traffic Study and Attitudinal Panel Study

7.7 Other Traffic-Related Findings

Although SOV violation rates in the I-15 Express Lanes were higher during FasTrak than during ExpressPass, they continued to be low and substantially below the pre-project level (4-5% versus 15% pre-project). The reduction in SOV violations is likely due to the enforcement activities and staffing by the California Highway Patrol (CHP) during the project at higher levels than before the project.

8. INSTITUTIONAL ISSUES

Many involved in implementing the project perceived the project matched or exceeded their expectations and that it was a success by virtue of people's acceptance of pricing. They stated it proved pricing was technically and politically viable. The continued operation of FasTrak beyond the pilot period is testimony to the success and public acceptance of the project. Media coverage was generally fair, objective and non-controversial. SANDAG was responsible for general management of the project and its coordination with other major partners such as California Department of Transportation, California Highway Patrol, Wilbur Smith and Associates, San Diego State University and others. This job was done very well, and has greatly contributed to the overall success of the project and its national visibility.

The role of the political champion of the project, Mr. Goldsmith can hardly be overestimated. His leadership was critically important in identifying pricing as a policy able to alleviate congestion on I-15. He succeeded in convincing the public about the potential benefits of the proposed project, in securing the necessary funds to implement it, and in obtaining the required legislative approvals for the project initiation and extension.

9. SUCCESS OF THE I-15 HOT LANES: SEARCHING FOR THE REASONS

The main factors contributing to success of I-15 pricing project in San Diego can be listed as follows:

a) The vision of the project was clear from the beginning; the idea to improve transit in the corridor and to better utilize previously underutilized HOV lanes was non-controversial.
b) An influential political champion was able to make the idea a reality.
c) The project was consistently presented as a win-win-win solution, with all parties gaining something directly or indirectly.
d) Increasing number of subscribers became interested in purchasing a "safety net" type of tool to combat congestion when an important trip was at stake.
e) Technical performance of the system was very reliable: free-flowing travel conditions were delivered 99% of the time.
f) Per-trip pricing system appeared non-elitist allowing virtually anybody to become a subscriber.
g) The marketing of the high image of the project was very effective.
h) High visibility of the project was a catalyst to bring good collaboration among key stakeholders
i) The project was very well managed by the local planning agency.
j) Media coverage was fair and non-sensational, media relations were good.
k) The HOT lanes solution did not involve "taking away" any lane; conversion from HOV to HOT version looked like a logical improvement.

It is not clear whether all the factors listed above need to be present when a similar project was to be considered for another urban freeway anywhere in the world. Local conditions do vary significantly from city to city. However, most the factors that contributed to the I-15 success are good common-sense expectations that should help any other similar project to succeed.

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