

# Houstonians Embrace METRORail

By Dr. Vijay Mahal

In the second week of November 2007, Houston METRO celebrated a major milestone when it transported the 40 millionth boarding passenger on METRORail, a light rail system that opened in January 2004. The 7.5-mile starter line now supports about 45,000 passenger-trips each weekday. METRO, the transit agency responsible for METRORail, did not expect to achieve that level of ridership until 2020.

Historical data indicates that ridership growth on METRORail has steadily increased (Figure 1). Ridership counts taken just 10 months after service began already exceeded the opening-year forecasts produced using METRO’s travel forecasting models. The models projected the daily ridership on METRORail would be about 40,000 boardings (including special event trips) in 2020. But in September 2004, one day’s ridership on the LRT line alone was approximately 33,000, as shown in Figure 1. When special events trips generated by the 2004 Super Bowl game were included, the daily ridership reached a peak of 41,300. Clearly, the original travel models significantly underestimated the ridership potential of the rail system.

## Opinions Matter

So, what makes this light rail system so successful? Which played the greater role—the schedule, the destinations, the reliability of service or the quality of the vehicles?

To answer these questions and determine why METRORail became an overnight success in a car-dominated city like Houston, three major passenger surveys have been conducted since the light rail line went into service. The first was an on-board passenger survey conducted in October 2004, 10 months after the rail service was implemented. It was designed to collect a wide range of data relating to the travel characteristics of light rail users. The second survey was conducted in the first two weeks of November 2004 to supplement the first survey. The purpose of that survey was to determine the number of METRORail riders who were new users of METRO’s transit services. The second survey was very short, with only five questions, resulting in an extremely high return rate of more than 45 percent. The shorter survey also allowed passengers more time to write comments, and over 90 percent did so.

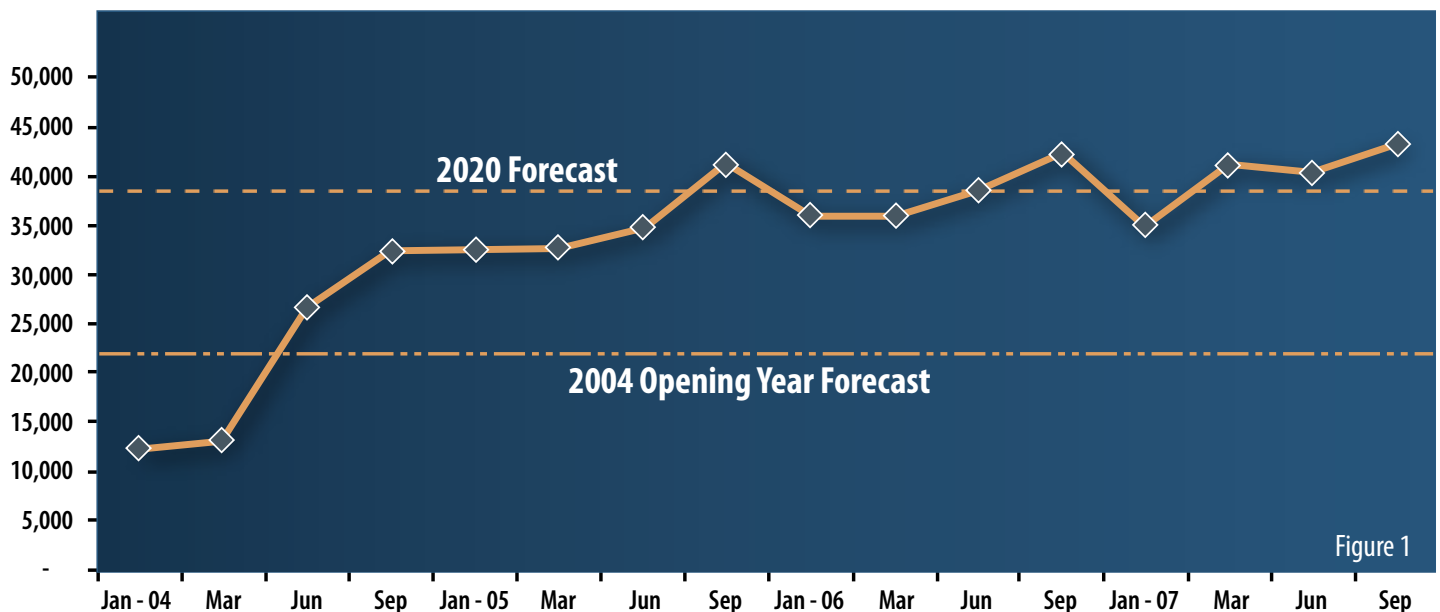


Figure 1

Ridership on Houston METRORail has steadily increased since operations began in January 2004.

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The third survey was a comprehensive origin/destination survey conducted in the spring of 2007. The purpose was to collect detailed data about the METRO transit system so the travel forecasting models could be updated and calibrated properly.

In all of these surveys, passengers were given an opportunity to express their opinions about their rail line experience. In general, the survey results indicated 90 percent of passengers had very positive opinions about METRORail. The most frequently cited reasons for their positive opinion related directly to the operational characteristics of the rail mode such as speed, reliability, frequency of service and the smoothness and comfort of the ride. Interestingly, many survey respondents made a comparative evaluation of the rail line with respect to the bus mode. For example, several passengers reported they liked the rail line better because it traveled faster than a bus, arrived on time and did not make as many stops as the bus.

Of the three surveys, the second survey conducted in 2004 offered the most comprehensive insights about how Houstonians perceive the rail mode. Most of the comments were quite descriptive in nature. They related to the improved accessibility METRORail provides to Texas

Medical Center facilities and educational institutions such as the University of Houston, Rice University and the Houston Community College System. Many patrons indicated they were receiving a higher quality of service from rail than on the bus, making the rail fare a better value. At the same time, a number of passengers also requested METRO not increase fares on the rail line in the future.

The results of the 2007 survey indicated that METRORail elicits a very positive response from its ridership. As seen in Figure 2, 81 percent of survey respondents believed the rail line operated on time and 68 percent agreed that the vehicles are clean and well-maintained. A strong 35 percent of the respondents suggested that the rail system be expanded immediately to other areas of the metro region.

An important finding from the 2004 survey was that approximately 37 percent of the light rail users had never used Houston METRO’s transit system before the implementation of METRORail. Stated differently, before the rail service began these passengers were using other modes of transportation for their travel, such as driving alone, carpooling and, to a lesser extent, bicycling or walking. The single most important reason each of these passengers became a “new transit

<b>2007 ORIGIN-DESTINATION PASSENGER SURVEY</b>					
Figure 2	<b>Strongly Agree</b>	<b>Agree</b>	<b>Disagree</b>	<b>Strongly Disagree</b>	<b>No Response</b>
<b>Rail Operates on Time</b>	28%	53%	9%	4%	6%
<b>I Feel Safe When Riding Rail</b>	24%	53%	13%	4%	6%
<b>Drivers are Helpful and Friendly</b>	21%	52%	13%	4%	9%
<b>Vehicles are Clean and Well Maintained</b>	17%	51%	18%	6%	8%

The majority of riders have found METRORail to be a reliable, safe and pleasant mode of transit.



Most transit patrons, at least in the short term, view a new light rail line as a premium-quality mode of travel.

user” was because of the rail system. In the transit planning industry, the percentage of riders that make up “new transit users” is also referred to as “auto diversion.” For large rail projects in most metropolitan areas, the auto diversion rate usually ranges from 5 to 20 percent. With Houston’s auto diversion at an unusually high 37 percent, METRO suspected that passengers may have misinterpreted the question and inadvertently provided incorrect answers. Therefore, in the 2007 survey, the same question was restated in a different manner. Originally phrased “Were you a METRO bus rider before METRORail opened?” it was reworded to say “I started using transit because of METRORail.” This time, the percentage of new riders was found to be 41 percent—fairly consistent with the earlier survey. The conclusion was that Houstonians were willing to try transit, if provided a high-capacity, premium-quality rail service.

### The Rail Bias Factor

A general consensus among many transit planners and transportation modelers is that when a new light rail transit line is built in a city that never had light rail before, the passenger’s perception of the new rail line is usually positive and often quite different from other transit modes. Most transit patrons, at least in the short term, view a new light rail line as a premium-quality mode of travel. This is typically characterized by safe, fast, reliable and on-time performance. Though these features are not quantifiable, in the travel modeling world they are referred to as “the rail

bias factor.” The Houston market has verified these conclusions about light rail service many times over through increased ridership and positive responses on the three surveys.

In all probability, the reason METRO’s travel models significantly underestimated rail ridership is the models did not contain the unique travel attributes of the light rail mode—the rail bias factor. The travel models created during the mid-1990s were based on data collected in the early 1990s, when light rail did not exist in the Houston region. That meant METRO’s models had no way of predicting the special attractiveness of the rail mode as perceived by Houston passengers.

### Adjusting the Models for Future Expansion

Now that it has been established that Houstonians have a positive bias toward rail, the data collected during METRORail’s first four years of operation could be used to introduce the rail bias factor into METRO’s models and improve their predictive power. HDR ran new travel models in 2007 and tested them with several rail bias factors in an iterative manner until estimated ridership from the model matched the observed ridership counts convincingly well. Several technical discussions with the Federal Transit Administration (FTA) took place during this process and in late 2007, FTA granted permission to Houston METRO to use the rail bias factor in their models.

Today, the improved models are being used extensively by Houston METRO to plan and design five major light rail expansions. These expansions are part of METRO’s long-range transit plan, which includes further expansions of the light rail system out to 2030.



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