

Doing More with the Same: How the Trinity Railway Express Increased Service without Increasing Costs

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Abstract

The Trinity Railway Express (TRE) is a cooperative effort of the Fort Worth Transportation Authority (The-T) and Dallas Area Rapid Transit (DART) in North Central Texas. The line connects the central business districts of Fort Worth and Dallas, traveling through the Mid-Cities suburbs of Irving, Euless, Hurst, Bedford and Richland Hills. Via a bus shuttle, the line also serves the Dallas/Fort Worth International Airport at the CentrePort station, midway between the two downtown districts.

In September, 2009, the Trinity Railway Express (TRE) successfully implemented a new service pattern that featured additional peak period frequencies to downtown Dallas and Ft. Worth, Texas. The service improvements were the final result of several years of effort by the staffs of The-T, DART and TRE.

This paper examines the methods used by the TRE to increase peak period services without increasing operating costs via a combination of engineering improvements, equipment enhancements, changes in dispatching protocols, increases in the maximum authorized speed and reductions in station dwell times.

Critical to the success was the cooperative partnership between the sponsoring agencies, DART and The-T and the Commuter Rail Service Operator, Herzog Transit Services, Inc (HTSI). Another key element was the flexibility found in the performance based contract that allowed for trading of costs without increasing the overall charges to the agencies.

History

Today the TRE has grown from a 10 mile, three station Rail Diesel Car (RDC or in modern terms, DMU) shuttle in 1996, to 34 miles and 10 stations utilizing locomotive hauled bi-level coaches predominately. As the service extended westward from Dallas County into Tarrant County (Fort Worth), the ridership grew significantly. The initial ten miles yielded an average of 2,500 passenger trips per day.

The expansion into Tarrant County instantly doubled the ridership to almost 5,000 trips daily and created a prevailing ridership pattern of Tarrant County residents traveling to work in Dallas County which characterizes the TRE today. Ridership growth continued until the apex of gas prices in 2008. Subsequently, TRE's ridership exceeded 12,000 trips a day Monday through Friday. To date, the TRE averages over 9,000 trips during weekdays.

A key element in the expansion to Tarrant County was the transfer of dispatching from the BNSF to TRE on January 21, 2001. The control of the dispatching allows the TRE to direct its own destiny in terms of when the trains operate and the number of trains operated. TRE has the ability to add or subtract trains as necessary to meet the ridership demand.

Equipment

The first steps toward increasing the efficiency of the service came in 2000 when the primary fleet of thirteen (13) Rail Diesel Cars (RDC) was enhanced with the acquisition of four (4) F-59 PH locomotives and twelve (12) bi-level coaches

from GO Transit in Toronto, Canada. Since that time, the fleet has continued to expand with the acquisition of 2 F-59PHI locomotives, seven (7) cabcars and six (6) coaches. In 2009, TRE again acquired equipment from GO Transit in the form of three (3) 1988 era F-59PH locomotives. Once these units are rehabilitated and returned to service, the last of the RDC/DMU fleet will be retired.¹

The shift from DMU to locomotive hauled equipment provided a major cost savings. In addition to the significantly lower capital cost per seat, the staffing requirements for a train of either type of equipment are similar. Each train requires one train operator and one train attendant. Fuel consumption is equivalent at two gallons per mile.

The savings are realized when the ridership demand exceeds approximately 280 seats on a train. This is the seating capacity of either a two car bi-level consist or a three car RDC set. To provide a seat costs approximately \$0.064 per seat mile (one seat traveling one mile).

The expansion west created peak period passenger demands which required the TRE to commence operating consists of three and four bi-levels. These load greatly exceeded the carrying capacity of the earlier RDC trains. A three car bi-level train costs \$0.048 per seat mile to operate. Adding the fourth car to the train decreases the costs to \$0.042 per seat mile. In the future, the TRE plans to operate five car trains at a cost estimated to be \$0.037 per seat mile.²

Infrastructure Improvements

The TRE route was acquired from the estate of the Chicago Rock Island and Pacific Railroad in the early 1980's. The original TRE service between South Irving and Dallas Union Station improved the easternmost portion of the railroad and began the

process of installing Centralized Traffic Control and adding track to expedite the movement of trains.

The siding work was concentrated on the eastern side of the corridor which allowed for frequent service between the stations of CentrePort, Medical Market and downtown Dallas. Service to the western side of the corridor was still limited by significant segments of single track. These segments of single track limited not only the operation of the peak period passenger trains, but the off-peak usage of the line by freight carriers.

The TRE hosts four different freight carriers: the BNSF Railway, the Union Pacific Railroad, the Dallas, Garland and Northeastern, and the Fort Worth and Western. The BNSF and UPRR both operate unit trains over the TRE, in addition to rock trains and general merchandise movements. The revenue generated by the freight traffic is a key component in the financial plans of the owning agencies. In order to best accommodate the freight users, all improvements are designed to allow a maximum authorized freight speed of 50 mph. This also allowed for a passenger speed of 79 mph.

The Strategic Plans of the parent agencies called for the eventual double tracking of the entire corridor along with the installation of bi-direction signaling to allow for operations as multiple main tracks. The Strategic Plans also included a goal of 25 minute bi-directional headways during the peak periods. As the planning studies continued, it became clear the funding to completely double track the railroad would be a very long time in coming. Thus, in cooperation with the freight railroads, especially the BNSF, (who provided the computer simulation work and provided much of the operational analysis), TRE began a careful study of where new track capacity should be installed to maximize the operational flexibility of the route for all users, both freight and passenger. The result of this study was a detailed program of capacity improvements to allow for increased freight traffic and more efficient passenger operations.

By 2007, the TRE route could accommodate a peak period service of 20 minutes in Dallas County and 40 minutes in Tarrant County. Two challenges remained to be addressed; first the track

¹ The RDCs are being leased to the Denton County Transportation Authority for use on The "A Train" until modern equipment arrives.

² All costs are based on FY2010 numbers with ULSF diesel hedged at \$3.00 per gallon. Increases in consist size do not noticeably affect fuel consumption.

configuration could not sustain the stated goal of 25 minute headways for bi-directional peak period train service. Not only could all trains not operate the full length of the corridor into Fort Worth in the afternoon, but the track configuration did not permit for headways less than 40 minutes west of CentrePort. The solutions came in the form of various projects. The projects had been identified in the strategic planning effort mentioned earlier.

The initial project installed a new passing track in Richland Hills. The second converted a hand throw crossover at the Fort Worth Intermodal Transportation Center or ITC to a dual control facility which allowed for passenger trains to meet at that location. The third was construction of a short section of double track in Dallas, connecting two existing passing tracks near the Medical Market Station.

A secondary benefit of this project was the improvement of the grade crossing warning devices in the area to allow for 79 mph operations, in lieu of the 30 mph previously permitted. The fourth was the construction of a passing siding immediately east of the CentrePort station.

The combination of these projects provided an infrastructure capable of meeting the primary goals of the Strategic Plan without the capital costs required to construct a complete second track.

The final component of the infrastructure enhancements was the up-grading of the grade crossing warning devices to allow trains to travel at 79 mph.

Increase in Maximum Authorized Speed

The increasing of the Maximum Authorized Speed (MAS) passenger speed from 60mph to 79 mph provided two major benefits³:

First, the travel time between the two downtown central business districts was reduced to less than 55 minutes. This service enhancement achieved a long term goal of the TRE for downtown to downtown trip times of under an hour. Previously,

³ MAS for freight remains at 50 mph.

the concept was to implement a peak period "express train" to establish equivalent travel times.

The express concept was never implemented due to the capital expenditure necessary for a seventh peak period train consist. Additionally, the express train concept faces significant challenges in determining which communities would or would not be served.

Second, the TRE's operations and mechanical facility is at midpoint on the railroad. This unusual location is a result of the growth of the railroad westward and its' tripling in length. (Originally, the facility was situated at the west end of the service area when operations commenced in 1996.).

As a direct result, TRE trains entering or leaving service expend a fair amount of time on deadhead travel to or from terminal stations at the beginning or end of revenue service. The speed increase allowed for the amount of deadhead time to be reduced, lowering train hour costs.

Train Hours and Car Miles

The performance based contract between TRE and HTSI was created to allow the maximum flexibility in the operation and maintenance of the railroad. HTSI has a "Turn-key" contract with the TRE, acting as an agent for parent agencies.

The contractor is responsible for right of way maintenance, staffing of the trains, dispatching the corridor and maintenance of the equipment. Payments to the contractor are based on four major items:

A base fee is charged to the agencies for General Administration, Maintenance of Way, and Overhead.

Train hours (the time a train of any size is on the mainline).

Car miles (car or locomotive miles traveled on the main line) and capital maintenance items.

It is the flexibility of the contract allowing for trading train hours for car miles that allows for extremely cost effective improvements to the service.

Once a new piece of infrastructure is completed, opportunities exist for a reduction in train hours, owing to the ability to shift the service pattern taking advantage of the new track or signal improvements.

The resulting savings in train hours can be translated into increases in car miles. The operating efficiencies realized by infrastructure improvements and speed increases produced a marked savings in train hours as the travel times for both the revenue and non revenue moves decreased by over 10%.

The number of weekday train hours was 75.75 in FY2008, 75.61 in FY2009, and is 67.88 in FY2010. Yet, the number of car miles rose from 6,337 in FY2008 to 6,742 in FY2010.

Over the same period of time, the ratio of car mile expenses to train hour expenses shifted from 65:35 in FY 2008 to 69:31 in FY 2010. From the viewpoint of the traveling public, more service is being offered. Nevertheless, from the viewpoint of the contracting parties, the costs remain relatively similar.

Schedule Modifications

The central location of the Equipment Maintenance Facility (EMF), the starting and ending point for all train consists provides both challenges and opportunities. The main challenge is that many trains must deadhead as much as 20 miles before beginning revenue service.

The opportunity manifests itself by being able to offer service in the shoulders of the peak periods and at late night, to the middle of the railroad at CentrePort Station at a very low incremental cost.

The TRE staff converted a number of the equipment moves from non-revenue to revenue status. This method enabled an increase to the reportable revenue miles for the National Transit Data Base for a comparatively low additional expense of a few minutes in train hours for station dwell and the wear and tear cost of opening the doors.

As staff studied the service plans, the TRE discovered methods allowing shifting the ratio of

revenue hours to deadhead hours from 86:14 in FY 2008 to 89:11 in FY 2010 thereby allowing the TRE to provide more service at little incremental cost to the sponsoring agencies.

The service pattern for the TRE since the line was extended to Fort Worth in 2001 included a number of half corridor trips from Dallas to CentrePort. Hourly service was provided on the eastern half of the corridor, with only about half of the midday trains traveling cross corridor.

Careful studies of the ridership patterns revealed a marked difference in the utilization of the trains. Two half corridor trips from Dallas to CentrePort attracted less than half the ridership of a single cross corridor trip from Dallas to Fort Worth. As costs were comparable, the service plan was changed to reduce the frequency of half corridor trips, while increasing the frequency of trips to Fort Worth. Although the total number of trains was reduced, the ridership per train increased.

The final result of the improvements over the years occurred in September of 2009. The TRE was able to reduce the peak period headways into Fort Worth from 40 minutes to an average of 30 minutes. Simultaneously, the completion of the Richland Hills passing track allowed for the extension of two morning trains further west.

A greater enhancement for the riders was for the first time, the TRE was able to operate all evening peak service trains across the full corridor. This permitted the TRE to address one of the most common concerns from the riders regarding the evening service, the long peak period headways into Tarrant County.

Summary

In these times of fiscal constraints, it is critical commuter railroads receive the maximum value for every dollar expended. By conducting detailed analysis of the ridership patterns and service plans the TRE staff and HTSI have been able to provide more seats on its corridor for little or no incremental costs to the sponsoring agencies.

The cooperation between the sponsoring agencies in determining the priority of capital work and designing projects to provide enhancements to the operation of the corridor as a whole, instead of merely in a single county has been another crucial element in improving the efficiency of the railroad.

Finally, without a strong working relationship between the staffs of DART and The-T, staff of the Trinity Railway Express and the Commuter Rail Service Operator, Herzog Transit Service, Inc. it would have been extremely difficult, if not impossible, to achieve the level of cost effectiveness the TRE enjoys.