Case Study
The Sheffield Flyover, Kansas City, Missouri[1]

This project illustrates how public agencies can work with the private sector to expand capacity and improve the performance of the local transportation system, with benefits to the region and the nation as well. This project, which had substantial public as well as private benefits, only became feasible when public agencies and the railroads figured out how to work together and share the costs.

Overview

The Sheffield Flyover increased the capacity and improved the performance of a major bottleneck in the rail network in and around Kansas City. At-grade crossings of high-density rail routes had not only led to train backups, but also caused extensive delays to highway traffic when trains blocked local streets. An innovative public private partnership helped secure funding for and ensure the successful implementation of the flyover. Because of the success of the Sheffield Flyover, the railroads and public agencies decided to build a second major flyover in Kansas City in order to secure similar benefits.

Project Description[2]

The project addressed a key bottleneck in the national rail system where the Burlington Northern Santa Fe (BNSF) main line crossed the Union Pacific (UP) and Kansas City Southern (KCS) main lines. With 100 to 120 trains operating on the BNSF, 60 to 80 on the UP and KCS, and another 40 to 60 local trains operating in the area, this was described as the "third busiest railroad intersection in the country". Trains were inevitably delayed as dispatchers worked to route them through the bottleneck; the delayed trains blocked highway intersections for a mile or more. The resulting delays were especially difficult for trucks seeking to enter or exit a major industrial area hemmed in between the main lines.

By constructing a flyover, it was possible to eliminate rail and highway delays associated with train interference at the crossovers. The project covered nearly three route-miles almost entirely constructed on the Kansas City Terminal Railroad's right-of-way; it included a main bridge of 6,740 feet and two other bridges of 890 and 150 feet. By double-tracking the flyover and keeping the existing tracks, it was possible to greatly increase the capacity of the intersection, thereby improving the flow of trains moving through Kansas City and also providing better service to local rail customers. From the public's perspective, the most visible benefit was expected to be a reduction in delays at grade crossings. Transystems, a consulting firm involved in evaluating the project, estimated that an average of 530 vehicle-hours would be saved daily for cars and trucks by elimination of grade crossings, based upon the train volume, the average time that each train blocked a crossing, and the 4,500 daily highway vehicle movements through the area. At $14/hour, this was estimated to amount to a savings of $1.85 million annually. In addition, with fewer trains and vehicles delayed in the area, emissions were expected to be sharply reduced.

Transystems did not provide details on the railway benefits, but indicated they would be approximately three times as great as the public benefits. This is borne out by a quick assessment of the benefits from reduced train delay. If 150-180 trains per day each saved 20 minutes in moving through this region (as estimated by Transystems), that would be a savings of more than 60 hours of train delay per day or 20,000 per year. The cost per train-hour is commonly estimated to be on the order of $250/hour based upon the hourly cost of equipment ownership plus the opportunity

[1] This case study is based upon material prepared by C. D. Martland for the National Cooperative Highway Research Program as an example of public/private partnerships. The case study was part of the research conducted under research project NCHRP 8-42 "Rail Freight Solutions to Highway Congestion."

[2] Transystems Corporation, "Kansas City Terminal Railway Flyover Project: A Public/Private Cooperative Success, Presentation" to **Financing Freight Transportation Improvements**, FHWA Conference, St. Louis, MO, April 29, 2001

cost associated with the loads themselves. Hence the delay cost of an average 20-minute delay to these trains would exceed $5 million per year.

The project cost was $75 million. Raising the capital was a stumbling block for the railroads, even though they were willing to pay for the project on a continuing basis. Another problem was that construction would increase the assessed value of the property and therefore the property tax owed by the railroads. Various public agencies were interested in providing financial support, but there were barriers to using public funds. At one point, it appeared that a Federal Highway Administration (FHWA) loan would be approved to finance 25% of the project, based upon the public's share of the project benefits. This loan possibility fell through when trucking interests objected to the use of highway trust money for rail projects. State agencies were interested, but were prohibited from investing in a private sector project.

The financing problem was resolved by creating a "Transportation Corporation," a quasi-governmental entity that can be created under Missouri law that can receive highway funds. A "T-CORP" can issue 20-year, state tax exempt bonds to fund transport projects, and it receives real estate tax abatements. A "T-CORP" is represented jointly by the project owner and the Missouri Highway Department"; the T-CORP owns the land and the project until the loans are paid off, at which point the land goes back to the previous owners. The net result for the Sheffield Flyover was that the T-CORP issued the bonds, the US DOT provided a letter of credit, and the railroads agreed to repay the loans. In addition to benefiting from low interest rates, the corporation enjoyed a property tax abatement worth $1.4 million per year (estimated by Transystem as being nearly 20% of the annual amortization costs).

The project required a few other elements of cooperation. The project was supported by the Heartland Freight Coalition and the Greater Kansas City Chamber of Commerce, as well as the Missouri Department of Transportation, Federal Highway Administration (FHWA), and the railroads. Some public land was needed for the flyover, and a land swap was arranged with the City. While the project was underway, work was done to modernize or coordinate 14 different utilities serving this industrial area. Also, a portion of one of the city streets had to be reconstructed and temporarily closed to enable completion of the flyover.

Motivation

Kansas City is the second-largest rail freight hub in the country after Chicago. It is served by four Class I railroads: (Burlington Northern Santa Fe (BNSF), Union Pacific (UP), Norfolk Southern (NS) and Kansas City Southern (KCS), while the Gateway Western provides an independent route that reaches CSX in St. Louis. The Kansas City Terminal Railroad provides local switching services, and various short line and switching railroads serve the area. The metropolitan area has an intricate network of classification yards, industrial support yards, and through tracks. A major problem within the region is that major rail routes intersect in Kansas City, resulting in extensive delays to both trains and highway vehicles.

The Mid-America Regional Council documented the importance of rail to the region.[3] Rail handled just over half of the freight tonnage moving through Kansas City. Over 80% of the rail freight was moving through the area, and this traffic amounted to 150 million tons in 2000. Much of this traffic was intermodal (i.e. containers or trailers that are transferred by truck between customers and intermodal terminals and moved by rail between the intermodal terminals). The BNSF's route from Los Angeles to Chicago, which handles 1.6 million containers and trailers annually, goes right through Kansas City. Another 23 million rail tons was received by Kansas City industries, while about 11 million tons were shipped out by Kansas City shippers. Rail's market share varies greatly with the type of movement. Rail accounted for approximately two thirds of the freight moving into or though the region; truck accounted for all of the intra-regional freight and more than three quarters of the outbound freight. The rail share vs. truck was growing for through traffic, stable for traffic inbound to the region, and declining for outbound traffic.

[3] Mid-America Regional Council, "Transportation Outlook 2030, Metropolitan Kansas City's Long-Range Transportation Plan", Mid-America Regional Council, October 2002

During the 1990's, it became increasingly evident that various national trends in rail freight traffic were disrupting both rail and highway traffic in the city. Rationalization of the network was concentrating more traffic on fewer routes, leading to congestion and interference within the rail network, as well as increasing delays to highway traffic. Trains waiting for authorization to proceed through an intersection often blocked automobiles and trucks at grade crossings, frequently for 20 minutes or longer. Mergers, traffic growth, and shifts in freight traffic patterns required greater capacity along key rail routes within the city, but the bottlenecks where key routes intersected threatened to limit growth of rail traffic.

The project therefore was seen to have both local and national significance. Grade crossings and local air quality were the obvious benefits for the local area. However, the movement of 1.6 million trailers and containers by train rather than by highway was recognized as much more than a local benefit, since these shipments might otherwise be moving on the highways not just through Kansas City, but also through many other cities throughout the country. Expanding the capacity of such an important rail hub was also of major significance for the national rail system. The 150 million tons of freight moving through the rail hub represented at least seven million truck shipments, including the intermodal trailers and containers mentioned already. This is a good illustration of a network-level investment where important improvements in system performance help retain existing customers and attract new customers.

Results

The project achieved its goals. Following the opening of the new facility in 2000, travel times for trains dropped from 40 to about 15 minutes.[4] This improvement in train efficiency translated directly into the hoped-for reduction in grade crossing delays and air quality. The institutional structure also worked well enough to be expanded. In February, 2002, BNSF announced that a second major flyover would be constructed to provide grade separation at the intersection of two of their main routes and improve access to Argentine Yard, their major freight facility in the region.[5] (BNSF, 2/15/02). The "Argentine Flyover", which would cost about $60 million, was initiated using the same institutional arrangements as the Sheffield Flyover.

The project received broad recognition as an outstanding example of public/private cooperation. The Intermodal Advisory Task Force of the Chicago Area Transportation Study identified this project as one of the best examples of "holistic" planning "involving major transportation industries, the political decision-makers, plus the industries (shippers and receivers, essentially) that stood to benefit."[6] Rawlings noted the key roles played by the Chamber of Commerce and the Mid-America Regional Council, who funded preliminary freight studies and were able to focus interest on and achieve a consensus for the flyover and a few other critical projects.

Lessons Learned

Table 1 summarizes the key elements of this project. In this case, the train volumes were so high and the benefits so large that it was easy for local parties to agree that the benefits justified the costs of the project. At intersections of busy rail lines, trains back up and clearly block the local highway network. These local costs were easily identifiable and large enough to justify public participation, even though the national significance of the project is what motivated FHWA's interest. The benefits were equally clear to the railroads, as were the costs to operations if action were not taken.

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[4] Cookson, Brian, "Railway putting flyover on track", The Business Journal of Kansas City - November 5, 2001 (from the November 1, 2001 print edition).

[5] BNSF News Release, "Second Flyover Bridge to Streamline Rail Traffic Through Kansas City," Kansas City, Kansas, February 15, 2002.

[6] Rawlings, Gerald, comments posted on "National Dialogue on Freight" Website (referenced March 14, 2003).

This project provides various lessons for promoting public/private partnerships that seek to enhance a system in order to achieve both local and national benefits:

- The involvement and support of the local interests is essential.
- The willingness of the various partners to work together and to negotiate ways to share the costs is essential.
- Federal, state and local cooperation can provide innovative financing mechanism and enable a complex project to be completed quickly.
- Environmental benefits may provide part of the story in support of the project, but the financing may need to be based upon a clear understanding that the system improvements – both local and national - translate directly into enough cost savings to justify the project.
- The national scope of the project may add to the story and motivate federal involvement, but it may not directly affect the local assessment of the project. In other locations, where the local effects are not so evident, it may be necessary to make a stronger case for the indirect and national benefits in order to secure local support and a broader base of funding.
- Once a coalition is formed to identify, finance, and implement projects that fulfill clear needs, then that coalition can quickly move on to additional projects.

Table 1 Key Elements of the Kansas City Flyover Project

Reason for PPP	Project justified by the combination of public and private benefits, and it required innovative cooperative relationships for implementation.
What was done	Rail lines and some public property were conveyed to a special public agency that constructed flyovers that eliminated some of the main at-grade rail-rail and rail-highway crossings in Kansas City.
Benefits	Financial: the railroads reduced their operating costs. Economic: reduction in delays to highway traffic at grade crossings.
Financing	Low-interest bonds and property tax abatement: the project was financed with low-interest tax-fee bonds, which would be paid back by the railroads in proportion to their use of the facility. By transferring the land to the city, the railroads would not have to pay property tax.
Major risks	1. Would construction costs be higher than predicted? 2. Would traffic volumes be high enough to produce enough revenue to cover the annualized costs of the project? This risk was thought to be minimal, as this region was the second-busiest rail hub in the country.

Resource: Project Evaluation: Essays and Case Studies

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