Understanding the Shared Operation of Commuter Rail Transit and Freight Railroads

Seeking a thorough understanding of shared operation between commuter rail transit and freight railroads, a nationwide survey was conducted of transit and rail freight interaction. This survey contacted and received responses from all 21 commuter rail services in North America. In addition to a general understanding of the shared-use practices, this paper presents the key factors that contribute or impede successful shared-use operations between commuter rail and freight railroads by examining detailed operation arrangements, shared asset management, dispatching priorities, accident histories, and insurance and liability issues. A few critical issues directly related to the success of future shared operations are highlighted for the reference of new-start systems and those who are seeking knowledge in the arena of shared-use operations.

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Congestion on highways and urban streets has stimulated renewed interest in commuter rail, light rail, and other types of guideway transit in a large number of cities. As those potential guideway transit projects appear on the drawing board or join the existing transit systems in service, more and more commingling of freight and passenger trains is being proposed or implemented.

The shared operation between rail transit and freight railroads is most prevalent among commuter rail operations. For example, according to American Public Transportation Association (APTA, 2003), all of the 18 existing and 38 proposed commuter rail services in the United States operate on shared tracks with freight railroads. In the context of this manuscript, shared operation was defined as simultaneous, commingled train operation on shared track by freight trains and commuter rail vehicles. The trend of railroad and transit shared use raises a greater concern about the safety of these services when they share common tracks, right-of-way, or corridors. It also raises concerns of scarce capacity.

The original study surveyed three modes of rail transit: commuter rail, heavy rail, and light rail transit (LRT). The latter two interact with freight railroads to a lesser extent than commuter rail services, if we define shared track as the most intensive interaction. Heavy rail transit often uses the freight railroad right-of-way to build their exclusive tracks, while LRT builds tracks also, but has designated time windows to separate freight trains operating on their tracks. This paper focuses on the interaction between commuter rail transit and freight railroads and related issues. The survey covers a wide range of issues related to the shared operations of commuter rail service and freight railroads, which is the first step toward a thorough understanding of transit and freight rail interaction. Note that this study is not an attempt to suggest solutions for all aspects of shared operations but to obtain a thorough understanding of the complex arrangements and diverse perspectives of various stakeholders.

The main objective of this research is to reveal the key factors that make the shared operation between commuter rail transit and freight railroads successful. It is important that the research team not only focuses on the operation arrangement but also seeks in-depth dialog with key persons during the survey so that the unique and complete process of acquisition or negotiation can be preserved. Through detailed review and analysis of peer transit agencies' practices, the research team has gleaned useful information and uncovered some key issues and concerns of interaction between transit and freight railroad operation.

CURRENT UNDERSTANDING OF SHARED USE PRACTICES

Joint operation of passenger service and freight railroads is not a revolutionary concept. It has a long tradition in the United States over the last century and is widely practiced in Europe, Asia, and other parts of world (Vigrass, 1995 and Transportation Research Board, 1999). Though it is fairly easy to locate anecdote stories of shared use or conflicting views of various parties in the existing literature, it is rather difficult to find any in-depth analysis or thorough understanding of the issues.

One relatively comprehensive study of shared-use practices goes back to the 1980s. In 1982, ITE Technical Committee 6A-28 conducted a national survey of "Transit, Commuter, and Freight Usage of Rail Right of Way" (ITE, 1985). This telephone survey collected information on the type of services shared, length of service and agencies involved. Like most efforts done by volunteers, this survey did not provide a complete picture of all shared-use experiences. Most notably, it was not possible to capture data on planning stages where shared use was rejected. It also significantly underestimates the presence of shared facilities on the U.S. east coast.

In 1999, Transit Cooperative Research Program (TCRP) carried out a study titled "Joint Operation of Light Rail Transit or Diesel Multiple Unit Vehicles with Railroads" (TRB, 1999). As stated in the title, this research focused on LRT and DMU operations not commuter rail transit. Neither Federal Railroad Administration (FRA) nor Federal Transit Administration (FTA) has developed any technical guidance after issuing a joint statement of policy concerning shared use in 2000 (Sheys and Spear, 2000). A recent study commissioned by FRA (Zeta-Tech Associates, Inc. 2003) did not cover shared commuter rail operation at all since its main concern is "common corridor," not "shared track."

The only nationwide survey similar in scope to this study was carried out by the General Accounting Office (GAO, 2004). Responding to the request of a ranking Congressman, this report highlights the role the federal government plays in negotiations between commuter rail agencies and freight railroads.

Commuter rail services predominantly share track, right-of-way, or operate on adjacent tracks with freight railroads. Due to the inherited structures of railroad operations, it is often taken for granted that commuter rail operations are sharing assets with freight railroads. However, the joint operation is much more complicated than what is reported and what it seems on the surface. Various regulatory, institutional, and operational issues need to be addressed before any successful joint operations can become a reality. Concerns of infrastructure capacity, safety, liability and cost are a few fundamental elements that need to be included in any joint-operation or shared-use negotiations. It is apparent that some in-depth analysis and thorough understanding of shared use between various commuter rail services and freight railroads are necessary to identify critical issues and best practices of transit and freight rail interaction.

SURVEY OF SHARED USE STAKE HOLDERS

There are only 18 commuter rail service providers in America and three in Canada. To accomplish the objectives of this study, the research team concentrated its effort on the existing rail transit systems and contacted all 21 commuter rail service providers and some of the interacting freight railroads.

Once the survey candidates were identified, an appropriate person or division to contact was selected within each transit agency. Chief operating officer, operating supervisor, or operation manager were considered to be appropriate persons.

Concurrent with the process of identifying survey candidates, the research team worked with NJ TRANSIT staff to develop a questionnaire which was designed to reveal the basic issues and to address related concerns over shared operations between transit agencies and freight railroads.

To fully utilize communication technology and save data processing time, the final survey questionnaire was posted on the university's website and maintained by project staff. The web-based survey gives transit agencies the flexibility to complete the survey either from the Internet or through paper media. It was

anticipated that communication technologies might not be evenly distributed among transit service providers. However, the research experiences so far indicate that electronic or web-based surveys can be used to a large extent among transit agencies.

After numerous attempts using various communication media, the research team obtained responses from all of the commuter rail service providers. The following sections present the main findings from the survey.

Physical Characteristics

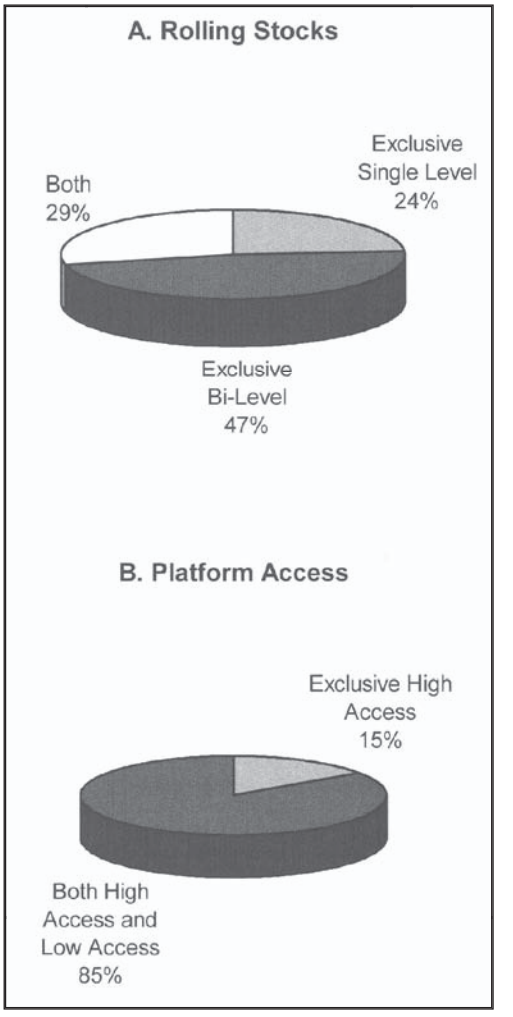
The first section of the survey is designed to collect information on the physical characteristics of the existing commuter rail systems: type of rolling stock, level of platform, type of freight operation involved in the shared operation, and type of interaction, such as shared track and mixed operation, shared track and time separated operation, shared right-of-way, and shared facility.

All commuter transit agencies share their operations with freight railroads to different degrees. Most commuter services, 80%, share tracks with both mainline and local freight railroads. Only 10% of commuter railroads share tracks exclusively with mainline freight and 10% share track exclusively with local freight. More than half of the rail services, 52%, share yard operation with freight railroads.

The large concentration of commuters, especially during the peak hours in the peak direction, demands that commuter service providers use bi-level rolling stock, this being the easiest method of increasing train capacity without requiring the added expense of station platform extension. Among the 21 commuter systems surveyed, 47% use bi-level cars exclusively, 24% use single level cars, and 29% use both bi-level and single level cars, as shown in Figure 1A.

Level of platform appears to be an important factor in the shared operation between transit and freight railroads. Choices of low- or high-level platform configurations are dictated generally by rolling stock equipment or by operator policy. Low-level platforms are preferred by freight railroads and are less expensive to build.

Figure 1: Physical Characteristics of Rolling Stock and Platform Access



However, the Americans with Disabilities Act (ADA) requires level boarding, which is largely facilitated by high-level platforms for commuter rail services. In shared operation, the major problem encountered with high-level platforms is the encroachment on freight car clearances.[1]

A total of 85% of commuter rail service providers use both high and low-level platforms, among which are a large amount of stations still served by low-level platforms, as shown in Figure 1B. Judging from the acceptance of high-level platforms, it was discovered that the commuter and rail freight interaction might have impeded the implementation of high platforms.

Operating Privilege

The ownership of shared assets of commuter rail is quite diversified, as shown in Figure 2. According to the survey, freight railroads own 41% of the shared tracks; transit owns 18%, and the rest are jointly owned, i.e. both freight railroads and transit agencies own part of the railway infrastructure. The research found that most tracks of all three commuter services in Canada are owned by their parent freight railroads. For example, the tracks of commuter train networks in Montreal and most tracks for GO Transit in the Toronto area are owned by the Canadian National (CN) Railway. The track of West Coast Express in British Columbia is owned by Canadian Pacific (CP).

Class I freight carriers who own shared tracks of commuter transit include Union Pacific (UP), owning the track of Altamont Commuter Express (ACE) and most of Capitol Corridor Intercity Train Service in Northern California. Norfolk Southern (NS) and CSX, owns part of the tracks of Virginia Railway Express (VRE), and Burlington Northern Santa Fe (BNSF), owns the track of Sounder Commuter Rail.

Tracks owned by transit agencies include Dallas Area Rapid Transit (DART) in Texas, Tri-Rail in Florida, the Coaster in San Diego County, and South Shore Commuter Railroad in northwest Indiana. Tracks with mixed ownership, by both freight and transit agencies, include VRE in Virginia, Caltrain in San Francisco, Metrolink in Southern California, Southeastern Pennsylvania Transportation Authority (SEPTA) and GO Transit in the Greater Toronto area.

As demonstrated in Figure 3, 43% of the commuter systems are dispatched by freight railroads, 24% are dispatched by transit agencies, 19% by third parties, and 14% are dispatched by freight railroads and transit agencies independently.

A detailed examination of dispatching protocols reveals that 31% of commuter systems have different dispatching protocols during peak and off-peak periods and 62% do not have such differences. Those that have different dispatching protocols during the peak and off-peak periods mentioned three situations. One of them is that transit has less priority during the off-peak time periods, such as Commuter Trains Network in Montreal, Metrolink in Southern California, and NJ TRANSIT. Another is that the freight railroad is not allowed to operate at all during the peak periods. Examples include Metro-North Railroad (MNR) in New York and the Coaster in San Diego County. The last situation is that commuter services will not operate at all during the off-peak periods, such as West Coast Express in Vancouver, BC. Caltrain has a time split with the freight railroads: at least one 30-minute window is provided for freight trains and intercity passenger service between 10 a.m. and 3 p.m., and at least one mainline is dedicated to freight service and intercity passenger service between midnight and 5 a.m.

Most commuter service providers enjoy dispatching priority over the freight railroads. However, a few commuter systems, such as GO Transit in Canada and VRE in Virginia, do not have such favorable treatment. This is a real point of contention, especially during the rush/peak hours. The protocols for some arrangements are written into the agreement or timetables, but for others, the protocols are maintained by current practices. One transit agency in California indicates that dispatching priority depends on current conditions since it is the freight railroads' judgment call.

The questionnaire asked if any incentive plans are used for freight railroads' cooperation. The incentive plan means monetary reward or penalty when interaction with freight affects the on-time performance of passenger services. A total of 43% of the systems use incentive plans while 57% do not. In most cases, if transit agencies own the railroad, there is no need for such an incentive plan. An example is the Coaster in San Diego County where the track and right-of-way is owned by the transit agency. The freight user, BNSF, pays the commuter system a fee based on train miles and there is no incentive plan.

Incentive plans are needed and worked well when the corridor is owned or dispatched by freight railroads or a third party. For instance, the agreement between Metrolink in Southern California and freight railroads dictates that "freight railroads (BNSF & UP) receive an incentive for commuter train on-time performance in territories they dispatch and maintain." ACE in California dispatched

Figure 2: Ownership of Shared Assets

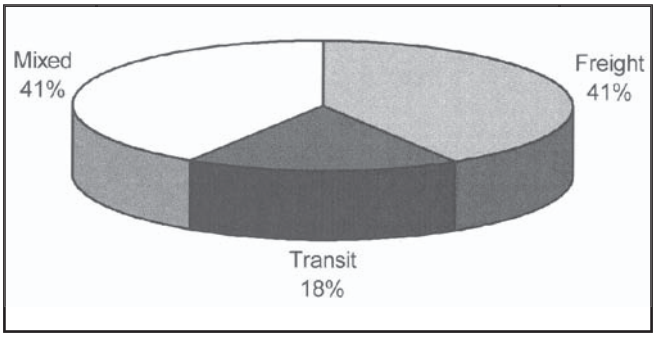
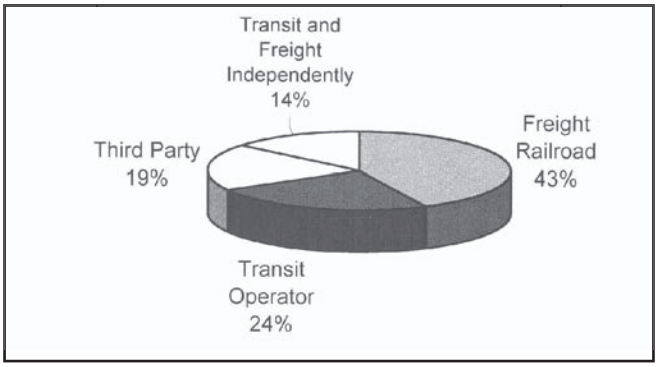


Figure 3: Dispatching Rights



by UP uses a penalty: "the delays which lower ACE on-time performance below 92% that are attributable to UP dispatching allow for a reduction in the dispatch fee." The commuter trains in Montreal, dispatched by CN Railway, adopted a different incentive plan: "$6,000 per month per line incentive if more than 97% of trains are on time, and $6,000 per month per line penalty if less than 95% of trains are on time." A representative of Capitol Corridor Intercity Train Service in northern California mentioned "if trains are run to the agreed on-time performance standard, the UP is eligible to receive an on-time performance incentive payment." The Sounder Commuter Rail has an incentive of $4.29 per train mile at 95% on-time performance and $5.85 for 100% on-time and no incentive for 85% or less. Others who use the incentive plans include VRE, METRA in northeast Illinois, South Shore Commuter Railroad in northwest Indiana, and the Shore Line East in Connecticut.

Insurance and Liability

The settlement of insurance and liability issues between the commuter rail and the freight railroads can be categorized into two major groups: transit operator maintains the insurance, holding freight harmless; or insurance liability is shared by both parties according to trackage agreement or service contract.

For about 75% of the 16 valid answers, transit agencies bear the risks or insurances. For example, a representative of SEPTA mentioned that the operators bear all the risks. A MARC representative mentioned "MARC holds CSX harmless; whereas Amtrak is only responsible for 'gross negligence.'"

Some systems have detailed insurance requirements between the two parties. For instance, GO Transit in Toronto covers $150 million and is liable everywhere except in the hub terminal, which it owns. The insurance

amount for Tri-Rail in Florida is $125 million; for the Sounder Commuter Rail, the insurance cap is $200 million and for METRA, between $250 and $500 million. A representative of West Coast Express in Vancouver said: "this is a complex question, but in general, on the liability side, the railway requires us to carry a $100 million liability policy." A representative from Caltrain in California mentioned that "Each party covers liability for property damage by and personal injury of its invitees, up to $25 million/year; after $25 million/year, UP will pay the share of Caltrain liabilities. Caltrain and UP must each carry insurance for at least $100,000 per incident."

In regard to the accidents that occurred as a result of joint operation, the questionnaire did not specify a time span, so the data collected in the survey include all the accidents that ever happened that are related to joint operations. Among the 21 commuter systems, nine accidents were identified, six being as a result of collisions and three being derailments. An accident happened on Metrolink that involved a passenger fatality, also an accident on Long Island Railroad involved employee injury, and one on SEPTA involved an employee fatality. All the accidents involved property damage. The damage amount ranged from $6,600 to $25 million. Only two systems answered how they deal with trespasser accidents. A representative of SEPTA said: "operator will be responsible" and the responses of the Long Island Railroad representative indicated all the operating parties on the shared asset would share the responsibilities.

It is evident that there are different attitudes regarding the interaction of commuter and freight rail in different regions of the country. Systems on the west coast seem to have a more collegial relationship than those on the east coast. This may be due to the high publicity of the accidents between freight and passenger trains in Washington, DC, in 1996 and Chase, MD, in 1991. East coast freight railroads tend to insist on maintaining the authority to dispatch trains and require a physical separation between their freight traffic and transit lines. This can adversely affect the passenger service when priority freight is not running on time.

Access Cost

As most of commuter rail services are concentrated in large metropolitan areas where freight services tend to have higher demand for capacity too, it is critical to balance the high demand and scarce supply of railway infrastructure. Unlike Amtrak, commuter rail agencies do not have statutory rights of access to freight railroads' tracks. If a commuter agency wants to use a freight railroad's existing infrastructure, it must negotiate with the freight railroad.

Among the 21 commuter systems, 52% of non-owning users get access to the corridor through trackage rights, 10% by property lease, and 5% by easement. Other major ways to get access to the corridors include operating contracts, shared use agreements, and franchises. In the case of Metro Link, which is owned by a consortium of transit agencies, access to the corridor is obtained through operating rights purchase, sales agreements, and shared use agreements. Transit member agencies paid for operating rights over right-of-way that the freight railroad owns. Member agencies also purchased the right-of-way from the freight railroad and the operating rights along that right-of-way were included in the sale price. Capitol Corridor Intercity Train Service obtained their access to the corridor via Amtrak's access right. In this case, property lease for stations and a maintenance facility were part of the state's procurement of right of perpetual access for a specified number of daily trains in exchange for capital investment and expansion of facilities.

Reaching a mutually agreeable price for the freight-railroad-owned right-of-way can be challenging, as reported by both commuter rail agencies and freight railroads. Some commuter agencies specified their cost to acquire the access to the shared right-of-way. The period of time covered by the agreements varies. For example, Caltrain spent $212 million as a one time cost obtaining perpetual trackage rights for up to eight trains per day. Sounder Commuter Rail negotiated a $321 million deal for a 40-year time span.

CRITICAL ISSUES RELATED TO SHARED OPERATIONS

To reveal the key factors that make the shared operation between commuter rail transit and freight railroads successful, the research team not only focused on the answers to multiple-choice questions, but also conducted in-depth dialog with key persons during the survey. Detailed review and analysis of survey results have revealed some key issues and concerns about the interaction between transit and freight operation which are presented in the following sections.

Physical Constraint

The dilemma faced by both freight railroad and rail transit operators is that rail segments, where passenger service providers require additional capacities, are often bottleneck areas of freight railroads. To compete with the trucking industry, freight railroads have to meet or exceed the speed and reliability of the truck lines to retain revenue. This fact can make it even more difficult to share tracks with commuter rail systems.

The FRA and quite a few commuter operators, both on the east coast and the west coast, realize that capacity constraint is the critical issue of shared operation with freight railroads. Concerns, such as future capacity needs and whether there is sufficient capacity to satisfy all users, were mentioned by those system operators. One system representative suggested that on high volume corridors, freight and passenger services need to be separated.

The representative of a commuter agency in the Northeast corridor suggested that the size and braking distance required by freight trains make it inappropriate to operate freight railroads during passenger service hours. Eisele (1985) outlined the fundamental conflicts between trains with different speed profiles and stopping patterns. He mentioned additional track should be considered. This idea is confirmed by today's practices, as several systems have added additional tracks and flyovers at bottleneck areas. One commuter service representative suggested double or triple tracks in areas that are heavily utilized by both passenger and freight rail operations.

High-level platform is another constraint to shared operations. As the survey reveals, most commuter services employed low platforms when they are part of a shared operation with freight railroads. When high-level platforms are not feasible, some commuter service providers used various alternative compliances, which include mini-high platforms, gauntlet tracks,[2] or retractable platforms. Transit agencies have to present credible evidence that supports the construction of alternative compliances deviating from the "level boarding at passenger stations" required by FTA (Goldstein, 2004a).

The recent close scrutiny of Sound Transit in Seattle, WA, and the proposed commuter service in Nashville, TN, may shed some light on the intricacies of this issue. Sounder Commuter Service, operated by Sound Transit, has been in operation for three years between Seattle and Tacoma and operates with low-level platforms for non-disabled passengers and with ramped mini-high platforms for those who can't step up into the train. One justification for mini-high platforms was that the "owner of the railroad, BNSF, will not permit the construction of full high-level platforms." Martin Minkoff, Director of Sounder Commuter Rail, explained: "The decision to utilize mini-high platforms was made in the initial planning stages for Sounder service and was based on our need to accommodate freight operations on the BNSF tracks. Our operating agreement specifies that Sounder platforms not infringe on the dynamic envelope and clearance necessary for freight operations." These requirements are further clarified in the property leases with BNSF: "Lessee further agrees said platform shall be constructed, maintained, and operated eight inches above top of rail and no closer than five feet four inches from centerline of lessor's track."

As demonstrated by the strict waiver requirement and legal bindings of the property lease or operating agreement with freight owners, the transit agencies must comply with freight railroad requirements. While the final conclusions on the result of those two commuter services

in Nashville, TN, and Seattle, WA, are still unfolding, the survey results indicate that other agencies employed alternatives, such as gauntlet tracks, mini high platform, and retractable edges along platforms, as demonstrated in Figure 4.

In the case of NICTD, the configuration of the station and distance between platforms are sufficient to allow the construction of gauntlet tracks. The gauntlet tracks allow freight trains to be shifted away slightly from the main track, and therefore the platform, to maintain the clearance envelope.

Retractable edges were employed at a number of stations of NJ TRANSIT, which allows high platforms on both sides of the two tracks of stations to be shared with a freight railroad. As pictured in Figure 4B, the front two feet of the platform could be retracted along the entire length of the platform when necessary to let a wide freight load through.

There are certainly other access innovations, such as retractable entranceways (Morlok, 2004), besides practices currently used. However, our concern raised via this survey is that more information or analyses are needed to justify the mandate for preserving the extra lateral clearance and specific configurations to provide level boarding. A representative of rail accessibility specialists (Goldstein, 2004b) stated that the extra lateral clearance demanded by freight railroads is defined by the possibility that wide freight may have to come through someday. In reality, there is no data on the usage of the extra lateral clearance envelope and anecdotal evidence demonstrated very little usage.

In short, it is important to anticipate the national defense need of mobilizing heavy equipment, such as large generators for power plants. It is also critical to preserve the continuity of the national railway network. Meanwhile, operation efficiency is also part of the performance measurement each transit agency or private company strives to achieve. One of the important conclusions derived from this survey is that more detailed data and analysis is needed on passenger and freight demand, their respective share of rail capacity, and overall allocations of those precious capacity or capital resources in the larger picture of overall passenger and freight movement efficiencies.

Moreover, additional infrastructure construction is constrained by the availability of funding and "political will," mentioned by a few representatives of transit agencies. One of them said: "Funding at State & Federal levels should be earmarked to allow future projects to move ahead for mutual benefit."

Dispatching and Scheduling

While safety is paramount for passenger services, reliability and on-time arrival are also vital in retaining customers for commercial success. As a representative of a transit agency on the east coast has mentioned, the fact that approximately one train in 10 will be late is not attractive to commuters, or to the transit operators. Some commuter operators are frustrated by not having dispatching priority. One of the commuter agency respondents said that when the dispatch is conducted by freight railroads, they give priority to their own time-critical trains.

As operating rights and other privileges are granted to freight operators, the value of the right-of-way to transit operators is reduced. Generally, dispatching authority goes with ownership of right-of-way. It is important for the transit agency, when negotiating for usage right, to focus on, not only the physical property, but also the various operating privileges such as dispatching rights. Even when the freight railroad has the dispatching authority, transit services can still negotiate for dispatching priority, at least for peak hours. That is the case with one of the commuter systems in California. When asked about who does the dispatching, the commuter agency representative said: "whoever owns the right-of-way." Then, he continued, "in general, commuter trains have priority during the morning and afternoon peak period."

An efficient schedule, which can accurately reflect the differences in speed of the various classes of traffic, is another important factor assuring commuter system time reliability. Such a schedule needs to be worked out by all parties involved in the shared operation. Several commuter railroad representatives identified "schedule" as the key factor of shared operation. One of the survey respondents said schedule constraints in track development and

Figure 4: Alternative Solutions for Level-Access Boarding

A. Gauntlet Track at Union Station, NJ TRANSIT

B. Retractable Edges in Westfield Station, NJ TRANSIT

dealing with the track window available for freight operations are the major impediments of shared operation.

Traditionally, it is the owner railroad that takes the lead in preparing the schedule, working with all of the tenant carriers on a mutually agreeable plan. However, the problem is that freight railroads do not often operate trains on a precise or reliable schedule. Random or flexible operation of freight trains often results in cascading delays, which is a nightmare for passenger services. A commuter service representative in Canada suggested that for better shared operation it is important to have railways understand that planned and on-time freight is more efficient for both freight and transit services.

In reality, it is not possible to always be on time. When freight trains are not able to adhere to their schedule, it is essential for the transit operators to recover from delays. That is why several commuter service providers have identified "experienced dispatcher" as another key factor in shared operation. For instance, one commuter service provider in the Northeast corridor suggested more dispatcher training and familiarization with the relevant issues surrounding the corridor they are dispatching. Another commuter system representative thinks an experienced dispatcher should be familiar with the corridor and all types of operations, and should have the ability to "stuff" the late train or the non-critical freight train into a siding, allowing for the faster, more urgent commuter train to go unimpeded.

Communications and Mutual Understanding

In the absence of legislation providing access, what would be the best way for new commuter services to gain access from freight railroads? One of the overwhelming responses the research team has obtained from the transit agencies is the recognition of the importance of good and frequent communication.

A few commuter service providers emphasize the importance of "communication" or "mutual understanding" for improving passenger and freight interaction. "Each discipline must understand the problems of the other operation. This helps performance and communication in both areas. "Communication must be established and maintained between the operational managers," says one commuter service representative on the Northeast Corridor. Another commuter system representative said "get transit agencies to understand the nature of the freight rail business. Get freight railroads to understand the requirements for public funding of transit projects (lengthy time, many steps, public review and comment, etc)." Other survey respondents mentioned that commuter systems should maintain a healthy dialogue with the freight railroads and should adopt good faith continuously in negotiations.

Insuring a high standard of employee qualifications and performance is important in shared operations. Cross-training might be helpful to enhance mutual understanding of both operational environments. Because passenger and freight operations have different operating characteristics, employees from a transit background may not be familiar with freight rail operation and vice versa. Thus, it is important for professionals from both parties to reach a mutual understanding, not only the dispatchers.

Freight Rail Attitudes and Regulation

In this survey, "freight rail attitude" is one of the frequently mentioned impediments to shared operation, such as "monopoly attitude of [the freight] railway," "the attitude that freight rail sees commuter service as a free way to upgrade their infrastructure," "owner's attitude to prioritize freight." One transit system respondent suggested using "regulatory leverage to offset railway monopoly attitude" and in total, 30% of commuter service representatives think "legal issues are the major impediments to ideal joint operation."

Historically, both freight railroad and passenger rail services were operated by a single entity, including employees, maintenance and equipment. The separation between passenger and freight services has complicated use and control of the rail resources by increasing competition for track access. Intermodal rail with a single management entity was changed to a host/tenant relationship. So, rather than

the former full-service railroad companies competing with one another for business, specialized, market-dominant rail users now compete for track space and capacity with the host carrier making decisions (Transportation Research Board, 1999).

The freight railroad's attitude may be understandable because transit services not only take existing capacity from the owner railroad, but also undercut the market share of the railroads without generating enough compensating revenue to them. However, rail passenger transportation has been recognized as part of the solutions to the national, regional, and local transportation challenges. Passage of the Clean Air Act Amendments (CAAA, 1994) and Intermodal Surface Transportation Efficiency Act (ISTEA, 1991) and Transportation Equity Act 21 (TEA 21) has exhibited national commitment to rail passenger transportation. Gillespie (2000) said that with hundreds of new transit agencies making an effort to negotiate an honest deal, it would be a mistake for the railroad industry to ignore the consequences of hundreds of angry commuters going to Congress for help on projects that Congress has already approved. Negotiating a deal with transit agencies for infrastructure improvement by asset-sharing gives railroads more benefit than being forced to share that asset through strict legislation.

On the other hand, transit operators need to understand the working environment of freight railroads. The freight railroad is subject to several industry-specific laws, such as the Railroad Retirement Act, the Railroad Unemployment Insurance Act, the Railway Labor Act, and the Federal Employers Liability Act, which mean regulatory burdens and higher operating expenses. Recent mergers have, for a short term, presented many of the Class I railroads with operating problems. Unlike rail transit operators whose primary mission is to improve and provide cost-effective transit service for the public, freight railroad owners are looking for return on private investment through competitive freight service.

A freight railroad executive highlighted the fact that passenger services represented 25% of train miles on a certain segment of their operation, and 17% of their train starts while contributing only 0.5% of their revenue. The fact that rail transit is "unprofitable" simply cannot satisfy the freight rail owner's investment return criterion. Meanwhile, the freight industry is blossoming too. The passage of Transportation Equity Act for the 21st Century, coupled with increased demand of supply chain management, have increased attention on the nations' efficient and reliable freight movement. In freight operational bottleneck areas it is hard for rail transit operators to get track access without providing some incentives.

Most transit agencies realize the importance of incentives, but some are frustrated with funding issues. A representative of a commuter system in Canada expressed his concern that a freight railroad may take advantage of the situation by using "commuter as a free way to upgrade infrastructures," while other survey respondents expressed their willingness to fairly share the cost of infrastructure upgrade.

Will legislation help offset the freight railroad's attitude? The freight railroads would strongly oppose such legislation, as demonstrated in the AAR policy statement (Association of American Railroads, 2004). On the other hand, even if legislation helped transit operators get through the railroad trackage access issue, will the legislation continue to foster a healthy, long-term relationship between both parties? Will a legislated agreement be better than the power of freedom to negotiate? Or what kind of strategies should regulators adopt to facilitate continued acquisition and use of railroad right-of-way by rail transit. These questions remain debatable and need further investigation.

Shared Responsibilities

In North America, liability is the single biggest institutional obstacle to shared operations between freight and passenger trains operated by separate entities (TRB, 1999). In spite of many concerns arising from shared operations, one of the primary fears is a catastrophic event resulting in major loss of life and property damage. Thus, an important condition for freight railroads to yield their track to a transit system is for them to be held harmless, regardless of fault. For example, in order for VRE to share the mainline tracks within the same right-of-way of Conrail, Congress was required to indemnify

Conrail, even though the passenger service is fully FRA-compliant.

The level of risk can influence the level of liability. As risk increases, the necessity for liability increases. Where passengers are involved, risk increases dramatically and liability can become excessively heavy. Higher risks for passenger operation create a dilemma for transit operators.

The survey results indicated that the range varies greatly in terms of liability cap. According to GAO (2004), in 1997 Congress limited the aggregate damages that may be awarded to all passenger claims from a particular rail accident to $200 million and permitted providers of rail transportation to enter into indemnification agreements. However, there was some confusion within the commuter and freight rail community as to whether the liability cap applied to commuter rail agencies, which could result in problems during negotiations. After reviewing the legislation, the GAO concluded that the liability cap applies to commuter rail operations, limiting commuter system liability to $200 million per accident. On the other hand, the $200 million cap may not apply to third-party damages aside from parties directly involved in the rail interaction accidents. Moreover, since the GAO opinion has not been tested in court, it is suggested that commuter service providers consult their general counsel or other legal and regulatory sources before refusing any liability insurance above $200 million.

Another major issue mentioned in this survey by the existing transit service providers is how to share the maintenance cost between transit services and freight railroads. One commuter service representative identified cost allocation of maintenance-of-way (MOW) expense as the critical issue of shared operation and suggested that government should regulate the calculation of shared cost and use. Another commuter rail operator in Canada also mentioned that transparency in sharing cost for the joint use of the track is the key factor to the success of shared operation.

Existing track construction and maintenance standards for passenger service requires costly and time-consuming maintenance activities using specialized equipment. Passenger operations require a higher level of maintenance and more frequent inspections. Heavier freight loadings and traffic tend to degrade track structure more quickly and accelerate frequency of maintenance. Track maintenance impacts both transit rail and freight railroad. A poorly maintained freight corridor can affect suspension of rolling stock, accelerate wear and tear on passenger equipment, and degrade passenger comfort. Current payment methods are traditionally based on the share of car-miles used by each entity. There are potential equity problems when different size and characteristics of rail cars share the same tracks. This situation is further complicated by "double stack" or high/wide loads.

Some studies address the intricate issues of allocating track maintenance costs on shared rail facilities. Lopez-Pita (2001) tried to weight the cost share fairly between passenger service and freight operation by considering the proportion of wear and tear and speed differentiation. Resor and Patel (2002) suggested that a cost allocation model might be used to derive the fair share of maintenance costs of a shared asset. The authors, using a model they have developed for Conrail, argued that the incremental costs of passenger services are large and the share of maintenance-of-way cost for freight should be much smaller than what AMTRAK has estimated. The general direction of the more detailed examination of maintenance-of-way cost share is encouraging, even though the specific accounting approach may warrant further discussion.

SUMMARY

As an effort to identify best practices and current impediments to shared operations between rail transit and freight railroads, this study surveyed a number of transit agencies in North America. Critical issues are commonly recognized even though each commuter service provider has its own unique operating, institutional, and regional characteristics. The overall responses from commuter service operators are positive in terms of interaction with freight railroads. They often cited critical issues such as dispatching and scheduling, freight railroad attitude, capacity constraints, communications, insurance and liability, and funding problems.

Sufficient communication with freight railroads was generally recognized as the key factor to a successful shared operation.

A review of usage agreements between transit agencies and freight railroads will give more detailed information on actual agreements between the two parties, helping the industry to establish an interaction standard, if possible. Also, a survey of proposed systems in different stages of planning, negotiating, and construction is believed to be able to reveal more information on difficulties of how to negotiate with freight railroads. As suggested by a survey respondent, it could benefit the country if priority issues of freight versus passenger services can be worked out at a national level. The good news is that a Rail Shared Use Special Interest Group (SIG) sponsored by the APTA is working with various stakeholders.

Endnotes

1. For detailed templates of clearance envelope, please refer to AAR clearance diagrams for unlimited interchange and limited interchange (Trainweb, 2002).

2. According to Australasian Railway Association, Inc. (http://www.ara.net.au), A "gauntlet track" is defined as a section of track where two lines of track overlap so that one rail of each track is within the rail gauge of the other.

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Acknowledgements

New Jersey Department of Transportation and Federal Highway Administration, U.S. Department of Transportation funded the original survey. We express our gratitude to the project manager: Nancy Ciaruffolli, New Jersey Department of Transportation, our customers: Jerry Lutin, Senior Director of Intermodal Planning, and Rich Wisneski, Project Development, New Jersey Transit, and other team members: Kenneth Addison, an independent consultant, and Branislav Dimitrijevic, New Jersey Institute of Technology.

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