PARADIGM SHIFTS IN THE INTERMODAL TERMINAL OPERATIONS OF MARINE CONTAINERS

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INTRODUCTION

The 1980s were very dramatic times for the railroad industry in the United States. Deregulation presented the opportunity for railroads to finally operate as market-driven companies, and intermodal emerged as a great source of incremental business. Railroads that had relied on growth in such traditional commodities as coal and grain soon found that intermodal growth exceeded growth of all other businesses.

Three main factors contributed to the explosion of international business, which proved to change the intermodal market profoundly. First, the growth of transpacific trade arose from the strength of the dollar, greatly increasing imports. Second, the passage of the Shipping Act of 1984 changed the law by which steamship lines operated, enabling, most significantly, steamship lines to provide intermodal service. Third, implementation of double-stack trains (DSTs) presented the industry with an entirely new and highly efficient method of moving containers.

As is often the case with innovations, DSTs were initially opposed. Naysayers from railroad transportation, mechanical, and engineering departments gave many reasons why DSTs would not work. Railroad commercial departments had just as many reasons to oppose DTSs. It was only through the dynamic and rather fearless leadership of the APL that the introduction of DSTs occurred. APL assumed all risk: operational, commercial, and mechanical. In retrospect, the intermodal business today might look very different if some of the railroads originally approached to handle the APL stack train had accepted—rather than opposed—DST movement. Once the APL stack train began, it became only a matter of time before other steamship lines found themselves at a competitive disadvantage if they could not offer the same service. Intermodal expertise on the part of steamship lines became more and more important.

Once the business was driven by international traffic, the growth into domestic business was inevitable. The condition of the railroad intermodal trailer fleet had been allowed to deteriorate. Investment induced by tax incentives in the late 1970s had proven to be disastrous to investors, and future investment was not forthcoming. The transportation services provided by steamship intermodal operators ultimately developed from initially offering westbound domestic repositioning to providing domestic movement in all directions.

To process containers, intermodal terminals were required to modify their operations. Most railroads tried to handle containers in the same manner they had handled trailers. This was frequently insufficient because the majority of intermodal terminals had been converted from carload facilities. They were constrained on capacity and had limited resources to spend on innovation. Intermodal was not a business that railroads were prepared to manage. Expertise built up over many years had been lost in the wave of restructuring and downsizings that railroads were forced to face in the middle and late 1980s. This lack of experience greatly affected railroad management of terminal operations.

The addition of marine, and subsequently domestic, containers to existing terminals often proved overwhelming. Many railroads compensated for their lack of expertise in managing containers by trying to change the terms of the commercial relationship. Some railroads imposed arbitrary fees and rules regarding the handling of international business. This would remove containers from the intermodal terminal so that railroads would not have to handle them. To avoid paying the high costs charged by the railroads, steamship lines needed to maintain separate operations in the same city. The rail terminal was only an interim step. A container yard served as the focal point between the steamship line and the customer. It was the responsibility of the steamship line to dray the container and chassis back and forth between the container yard and ramp. Rather than view steamship lines as their partners, some railroads viewed the steamship lines as adversaries. For example, senior railroad management made public comments about "boat people" not running their railroads. Although railroads talked about providing seamless service, very few provided it.

To many railroads, the panacea looked as if it might be the development of on-dock rail facilities. These were operated by ports and other marine interests, rather than by the railroads. The attraction was obvious. Infrastructure and investment would be financed by somebody other than the railroads. The railroads would

only provide movement. Most important, the railroads were not required to provide terminal operations to service international business.

THE CHANGING INTERMODAL INDUSTRY

The industry has matured since the advent of DSTs. However, the future challenges for the railroads are great. Intermodal growth has been accomplished through the surfeit of capacity that has existed. That excess capacity has been consumed—and then some. If railroads are going to change, the paradigms by which they operate must change. The traditional rules and methods of conducting business can no longer stay the same.

Railroads and steamship lines face a variety of problems. The steamship lines, especially those in the transpacific trade, have observed capacity grow and rates decrease. The development of discussion groups such as the TSA and WTSA is an admission by all that without some rationale for managing capacity, the industry will self-destruct. In addition, conference lines have found that they need to work to develop their intermodal cargo. On a port-to-port basis, almost all lines are the same. Inland expertise is what distinguishes one steamship line from another. In an effort to improve service, steamship lines have embarked on a series of vessel sharing agreements. This has served to disaggregate a line's business. Intermodal expertise has become even more important. Single unit trains from origin to destination are no longer possible because cargo that had been concentrated on a single vessel may now be disaggregated across several. In addition, it is necessary for the railroads to recognize that problems cannot be solved by ignoring them.

For the railroads and their steamship line partners to grow together, they must understand, address, and resolve the issues plaguing today's intermodal terminals. The intermodal terminal has become the rate determining factor in the service and capacity equations. Railroads are working to improve track capacity, either by using increased assets or through advanced technology. They are investing in new locomotives and improving the use of existing ones. What remains is the terminal.

Reworking of Trains

With the development of DSTs, the operational procedure has been for the intermodal operator (e.g., the steamship line) to load cargo at origin for movement through to destination. Such movement is often across several railroads. For example, a car will be loaded in Atlanta for through movement to Los Angeles, or a car will be loaded in northern New Jersey for through movement to Seattle. Cars may be switched en route between blocks and trains; however, the car loaded at origin moves intact through to destination. Expanding scope of service is constrained by having sufficient volume to load through to destination.

A cursory examination of other modes of transportation other than railroad intermodal reveals that it is very rare for transportation providers to load complete units from origin to destination. En route rework through a hub—such as the Federal Express hub in Memphis or the United Airlines hub in Chicago—has become the norm. An examination of the reconsolidation of intermodal traffic in locations such as Chicago shows that common practice is to unload the container to a chassis and depart one terminal by truck and travel to another terminal (crosstowning), where the container has to be brought in the gate and loaded to another outbound train.

An operation of this type causes many problems. First, crosstown trucking is an issue. As various external forces affect the trucking business, the reliability, availability, and economy of trucking has suffered. The trend toward seamless transportation urges eliminating this step. In addition, there always exists the possibility of further trucking regulations being implemented by cities trying to reduce pollution and traffic congestion. Increasingly in railroad terminals, gate operations have become "choke points." Long queues to arrive and depart terminals are becoming common. It is worthwhile to consider any reasonable solution to this problem. Inception of intraterminal reworking would be a major improvement in this area.

To increase scope and frequency of its westbound domestic program, The Rail-Bridge Corporation embarked on such a project in May 1992. Daily departures from seven northeastern points on Conrail and Norfolk Southern were brought in by rail to the Chicago and NorthWestern Global Two Terminal. Containers were reworked from car to car for six different West Coast destinations. The success of this operation enabled Rail-Bridge to increase its domestic business by more than 300 percent. Since that time, the number of origins and destinations has increased.

Intermediate reworking also can prove effective for eastbound operations. Due to vessel sharing agreements, it is not always possible to load solid cars to destination. Rather than ground and crosstown a load, we can bring connecting traffic to an eastern railroad's terminal and allow it to rework containers to various

outbound trains for movement to the ultimate destination.

Railroads traditionally have resisted this type of operation because terminals usually have "normal" inbound and outbound operating times, and mixing loading and unloading is avoided whenever possible. Nevertheless, intraterminal reworking allows the railroad to increase its capacity without necessary investment in gate infrastructure. Perhaps more important, it allows railroads to develop a much closer relationship with their customers. It enables railroads to distinguish their products, allowing true value-added service.

Integrated Loading from the West Coast

Although on-dock rail is growing, it will be some time before the bulk of international cargo is handled through on-dock terminals. Trucking from the marine terminal to the ramp will continue to be a large operation. The bridge movement of containers also poses a problem for rail intermodal terminals. West Coast vessel arrivals are usually bunched, causing severe peaking of terminal demand.

To respond to growing import volumes, several operating practices in the vessel-truck-rail interface need to change. First, rail terminal operators must work with the outside truckers. In the railroad intermodal industry, there is a widespread belief that truckers are inept and unable to follow instructions. For this reason, containers are parked on gate arrival. The terminal operator then plans the outbound loading of the containers. Yard drivers need to find the containers and spot them to trackside for loading. Although this certainly affords the terminal operator maximum control, it is expensive and time-consuming and uses scarce parking space.

Second, there needs to be a recognition within the industry that it is reasonable to pay intermodal draypersons extra for their extra work. Perhaps this suggests some sort of sharing agreement between the railroad terminal operator, steamship line, and dray persons. Despite the persistent talk of partnership in the intermodal industry, the discussion always seems to give way to silence when the issue of sharing money is raised. Marine terminals need to be involved in sharing arrangements. They need to discharge and dispatch containers using a more sophisticated method than is currently employed—one of discharging the containers off the vessel one by one and immediately dispatching them. One entity may be required to perform extra work (perhaps rehandling the container) for the overall system to be improved.

Under an integrated loading philosophy, vessels would be discharged and containers dispatched to the ramp in such a way that like destinations would be dispatched in blocks. It then would be possible for truckers to go to trackside immediately and for containers to be loaded promptly via live lift. Load planning for this procedure would not be necessary.

The benefit to steamship lines in using the integrated loading plan is that they would see their chassis returned immediately (asset reduction). As a result, steamship lines would not require as many chassis to support the same volume of outbound loading. The benefits to the railroad and terminal operator are obvious—yard spotting could be drastically reduced, as could clerical support, affecting an immediate expense reduction. A single steamship line could certainly dispatch its containers that way.

The next step would be to have vessel sharing partners use the same vessel, dispatched in the same order and loaded on the same car. If moving to similar destinations, they would not need to be loaded on separate cars. The railroad would see improved asset use of cars and the terminal. Steamship lines would be required to accept a very small loss of identity in their inland operation. This may not be so easy because some steamship lines still seem mired in the traditional mind-set of "my train, their train" and may prohibit coloading.

Integrated loading has been accomplished on a very limited basis by Union Pacific in Seattle, with "K" Line and Mitsui traffic discharged in Seattle on Monday evenings. Cargo is resorted by destination and dispatched in blocks. The small volume and lack of service sensitivity of the cargo, most of which is for weekend delivery at destination, make the operation less than urgent. Nevertheless, the operation is possible and offers a way for increased business to move to the terminal.

Treating Loads with Different Priority

The current service paradigm for steamship lines is that every single load is urgent and must be moved by the most expeditious means available. This often places an unnecessary burden on the intermodal terminal during peak demand. A terminal may have the ability to handle a certain amount of volume, with any volume above that causing severe operating diseconomies (e.g., empty car resets may upset the loading cycle). As mentioned earlier, steamship arrivals on the West Coast are characterized by volume peaks caused by bunching of vessel arrivals. Railroads would like to spread the peak

demand throughout the week. Not only would this ease the burden on the terminal, but also it would lessen peak requirements on other assets—such as railcars. To spread volume effectively, railroads must honestly judge the capacities that they can manage. They can then set standards and strive to achieve them, while not adversely affecting other business.

Under this paradigm shift, railroads would induce customers to hold a certain amount of business back to the following day or days. In exchange for this, rate incentives would be used. This concept vaguely resembles "day of the week pricing," yet is actually more aptly called "capacity available pricing." If the railroads were able to handle all business, they would accept all. However, if they believed that they were going to have too much business for their nominal capacity, they would attempt to induce some of it to be held back. This is not unlike the airline that overbooks and attempts to induce people to get off the plane and take a later flight.

This plan would also require that steamship lines have a much better understanding of their customers' individual requirements. Very often, cargo has been granted extended free time at destination, an indicator that the customer plans to hold the container for some period of time. This cargo certainly would be a candidate for some sort of origin hold.

Several years ago, Santa Fe Railroad introduced its concept of standby rates. This is a step in the right direction; however, it does not eliminate origin terminal dwell time. A load is tendered under a standby rate with the option for the Santa Fe to hold it for 24 to 48 hours. Under this envisioned situation, cargo would not be held at the rail terminal. It would be held at the marine terminal and would not be tendered until it was ready to move.

Provide Neutral Chassis Pools

One of the great arguments between steamship lines and terminals revolves around the amount of space consumed by intermodal chassis. Chassis are critical to steamship line and complete their service requirements. To handle peak surges, many steamship lines have asset investment levels that are not fully used throughout the year. However, to perform efficiently during peak demand they invest for the full year. Unused, these chassis are often held at the terminal.

From time to time in the past, railroads have established and offered for service neutral chassis pools, allowing an outsider—usually a leasing company—to provide chassis. This has been a "profit center" operation. Leasing companies have been in business to provide chassis at a profit over their cost of capital and operation. Charges have ranged from $9 to $12 a day—usually double what a steamship line experiences as its full cost of owning a chassis. As a result, barring complete catastrophe, steamship lines have been opposed to using these pools, and railroads eventually have had to close them.

This chain of profit centers is what has plagued the intermodal industry throughout its history. Despite industry talk about providing seamless transportation service, efforts to improve industry efficiency are often derailed by conflicts between parties who should be working together to improve service, but who are driven by the more pressing need to profit.

This problem begs attention. If railroads could provide chassis to steamship lines at a low cost, steamship lines could reduce the amount of chassis held in the terminal. This, in turn, would generate significant space in the terminal. Railroads claim it costs from $5,000 to $25,000 to build and maintain one parking spot. To induce steamship lines to remove chassis, railroads should provide these chassis at cost to free their terminals from congestion and avoid the necessity of investing in further parking. In cases in which the terminal is constrained and further expansion is not available (e.g., at most terminals on the West Coast and in Chicago), this capacity is extremely valuable.

There may be another option. Rather than having railroads invest in chassis when steamship lines have already done so, railroads could serve as a cross-lease "registry." When Line A has surplus of equipment that is not being used, the railroads could arrange for it to be used by Line B. In the event that lines are unable to come to a bilateral resolution of the per diem, the railroad would serve as the clearinghouse and "court of last resort." Certainly, many problems come to mind when considering this option, especially on the West Coast, where chassis may be picked up at a rail ramp and can be returned to a marine terminal. However, the potential savings could be millions of dollars a year in operating costs and avoided investment if the railroads could find a way to work with their steamship partners to manage this asset.

Stacking Empties

Currently containers are not stacked, and there is certainly substantial anecdotal history to remind people of the horrors of what can happen when containers are stacked. However, we must distinguish between empties, which are homogeneous, and loads, which are not. Marine containers are made to be stacked and sustain

great forces, on land and at sea. U.S. marine terminals often stack empties three to five or six high. In some parts of the world where land is at a real premium, empties have been stacked up to 10 and 12 high.

The railroads' fear of stacking containers revolves around their inability to quickly locate and extricate a container in a pile if required to. This does not have to be the case. Empties can be assigned on a fairly straightforward basis based on size, height, and material. Ninety-five percent of marine containers can be assigned as 20-ft, or 40-ft, or 45-ft, or 40-ft "high cubes."

Rather than having the steamship lines assign booking pickups based on specific unit numbers, they could assign pickups as a specific type and let terminal operators assign the empties, thus eliminating the fear of having buried containers assigned. Railroads should be able to take empties off the top of the pile or better yet, to keep a small supply of containers mounted on chassis for empty pickup and work them off the pile as they become necessary.

Several railroads have done this with great success. It works at marine terminals and should be available at other rail terminals. Here again, communication between the terminal operator and the steamship line is crucial so that a steady flow of empties is made available and surges do not cause congestion in the terminal.

Steamship/Railroad Integration

For steamship lines, rail transportation inland is only the beginning of the final transportation leg. Upon arrival at destination, it is usually necessary for containers to be cleared by U.S. customs and for steamship lines to collect ocean freight. After that time, consignees are eligible to pick up containers—subject to collection of other storage. In the past, railroads believed that the extent of their responsibility was to move any given load, and, at the expiration of free time, charges were assessed against the steamship line and/or the customer. Often these charges meant cash at the gate—a surprise to truckers—which understandably caused strains in commercial relationships between steamship lines and their customers.

To insulate their customers from the railroads' requirements, steamship lines often have opted to maintain two facilities at the destination city: the rail facility and container yard. The need to maintain two facilities has increased steamship lines' expenses because of the trucking back and forth and the need to invest in chassis to support two facilities.

Some railroads realized that to attract steamship business, they needed to provide a full menu of services at their terminals. The Chicago and North Western—with its Global One and Global Two facilities—is an industry leader. Many steamship lines have insisted on similar services from all railroads.

Railroads are slowly beginning to accept the inevitability of having to provide a type and level of service they previously never offered. Perhaps the greatest change has come in allowing steamship lines to "move" into railroad terminals—touching on a real issue of trust. Railroads must accept steamship business throughout their facilities. It is difficult for a steamship line to understand why a railroad will allow container yard functions at one facility and not at another. However, from another perspective, it is easy to understand why railroads would settle on such a strategy, given that they may have one facility that is fully used and one that is seriously constrained for space.

Regardless, it is necessary for both parties to work on a schedule of charges, timing, and implementation that is mutually acceptable. Not only does this apply to the inbound load, but also to the outbound. If railroads have come to rely on steamship companies for equipment to supply their domestic moves, the integration between the steamship line and the railroad becomes inevitable and more closely related.

Terminal Management and Information Technology

In the past, facilities that have been the most successful in handling containers have been either those designed and operated by a steamship line (e.g., "K" Line's E-Rail facility and APL's South Kearny facility) or railroad terminals designed exclusively to handle containers (e.g., Chicago and NorthWestern's Global One and Global Two). Terminals with mixed business have had great difficulty managing trailer domestic and marine international business. For intermodal to grow, this distinction must be eliminated.

Terminals must be able to meet the requirements of all business. Naturally, unbridled investment in new facilities will solve a great many problems. However, this is not a realistic scenario. More likely, information technology must be significantly improved.

For mixed terminals to increase their volume, train handling procedures need to be reviewed. Every railroad has unique rules regarding the placement of different car types in a train, presenting a major obstacle to mixing container and trailer traffic on the same train. While safety is never negotiable, reluctance to change operating rules—which often predate current intermodal technology—for no valid reason is not acceptable either. Improved loading of trains will require a significant

improvement in information technology and business practices. Here, the growth of electronic data interchange will be significant.

Railroads have embarked on the Interline Service Management Project (ISM), which will enable them to run "scheduled railroads." Unfortunately, it is going to be well into the next century (phase 2 or 3) before intermodal traffic will be integrated into this system. Even then, intermodal ISM will only schedule the line-haul and will not address the issue of terminal availability. For the industry to grow, intermodal ISM needs to be expedited and enhanced. Planning for service problems can greatly reduce their impact. Systems that allow planning of the impact of stochastic risk will facilitate improved handling.

Finally, to manage the business, there must be a way to capture all necessary components within the transaction. Movement and status information must be captured on chassis and gensets associated with a container. Railroads cannot manage terminals while only tracking containers. Not only must the railroad know what is in its terminals—the railroad must know the status of its terminals. For the steamship industry, automatic equipment identification (AEI) is not a panacea. Until AEI becomes an international standards, the cost will continue to be too high for steamship lines to tag all its container, as, at any time, 20 percent of their fleets are not in the United States. As a compromise, steamship lines should agree to tag chassis if in exchange the railroads would report them accurately. Furthermore, leasing companies need to improve the method of identifying their lessees of short-term lease chassis through other means than by decals and stencils.

However, information systems will never replace management. Most railroads have out-sourced terminal operation to vendors. At a minimum this involves basic operation and at a maximum involves a complete "turn-key" system. Some railroads have been content to have the operator manage the operation, which cannot work for long. If railroads are to improve their terminal-asset utilization, they must manage actively.

CONCLUSION

The opportunities for the intermodal industry are great. The ability to develop the business has matured to the point where, in most cases, uncomplicated solutions are not available. "Free" excess terminal capacity is gone, and uninhibited growth is precluded by the costs of involvement. Intermodal needs to work smarter; changing a few traditional paradigms would go a long way. The intermodal railroad and steamship industries have changed dramatically in the past ten years, and both are likely to continue to. Improved coordination and partnerships are the most likely tactics for survival and success. For it is quite possible that those who do not change may not survive.