On-dock rail has become such an accepted industry trend that we often forget that its development was almost accidental. Given the financial frailty of today’s ocean shipping industry, and the need to seek cost reductions wherever possible, we should review on-dock as we review all other elements of industry practices, for its practicality and relevance to today’s business.

**History**

International containers moving in intermodal service have three movement options:

1. **Off-dock**, which involves a container, mounted on a chassis and transferred by truck between the marine terminal and the railroad ramp.
2. **Near-dock** offers a container transferred (with or without a chassis) between a marine terminal and an adjacent, but external, rail loading facility.
3. **On-dock** features train loading within the same marine terminal as the vessel operation.

While double-stack transportation developed – primarily from the west coast -- off-dock transfer was normal practice. Following negative experiences with longshore labor on the east coast, APL and Sea-Land, the two industry pioneers were reluctant to allow longshore labor access to intermodal cargo moving off the west coast. (Remember that the Intermodal Container Transfer Facility, ICTF, was built off-dock in Southern California because all studies showed on-dock to be a high-cost and low-service operation that was unacceptable to shipping lines.)

In Long Beach, one line’s marine terminal invested to accommodate slab concrete business which never materialized. When that same line started double stack trains, the decision was made to load on-dock. The terminal configuration was not optimal, yet the operation started anyway. In 1988, the first major disruption with harbor draymen gave this line’s operation a marketable benefit – which it actively used to gain a further business advantage. Naturally, once one line had this on-dock edge – no matter how illusory -- every other line wanted the same. The ports followed suit. (i.e., Tacoma started their operation to offset the high drayage cost to Seattle and the railroads’ apparent indifference to their port.)

Today, almost every major marine facility has a proprietary on-dock facility included. It has become the standard, but is it the best option?
**Service**

While this article attempts to examine cost issues primarily, we must bear in mind that service continues to be a problematic area for our industry, as well. Ports are built by the water and rail intermodal terminals are built adjacent to rail main lines. Transfer from the port to the rail mainline can be time-consuming and fraught with uncertainty. Additionally, on-dock service suffers due to traditional marine terminal preoccupation with vessel operations coupled with their ongoing lack of intermodal expertise.

**Methodology**

No two terminals are alike. This study will try to compare rail intermodal operations in three venues. A “pure” rail operation in Chicago is evaluated against on-dock operations in the Pacific Northwest (PNW) and Pacific Southwest (PSW). All three of these represent composites of various operations within their geographic areas.

Expenses were estimated for both the terminal operator and the railroad. Expenses were estimated according to a best-case, worst-case and median case scenario. Expenses were based on a compendium of factors, including expense, volume and utilization. The median case was assigned a range of plus-or-minus 20% to establish a zone of reason. The expenses were calculated as if they were incurred by a single entity. Very often, the expenses are so disaggregated that overall evaluation is nearly impossible.

**Terminal Expense**

Terminal expense was calculated for labor, equipment, overhead and land.

Labor is the expense, including benefits, for the workforce performing the intermodal tasks. The critical cost drivers are lifts per man-hour and cost per man-hour. The former is productivity driven. The latter deals with work rules, labor agreements and traffic base.

Equipment expense calculates the ownership, depreciation, maintenance and operation of equipment used in intermodal loading, including lift devices and yard tractors. Critical cost drivers are ownership and operation. The former includes purchase cost, residual value, economic life and cost of capital. The latter includes annual lifts, mechanical labor and operational nature (e.g., tractors per crane or straddle carriers per shift).

Overhead expense incorporates expenses such as general management, insurance and systems. Annual expense and volume are the cost drivers here.

Land expense is based on an annual opportunity cost per acre. The size of the terminal, or on-dock loading area, and the annual volume will impact the average cost.
Chart #1 shows the range of expenses and Chart #2 shows the percentage breakdown. Clearly, the land expense in the PSW is the major difference, although the entire operation is quite expensive – up to three time the $80 cost to dray the load off-dock. The labor cost could even be understated. The additional demand for “good” workers to handle on-dock loading has only increased the likelihood of side deals occurring between terminals and the ILWU – which cause ripple effects throughout the entire labor market. (This trend is clearly demonstrated in the recent productivity statistics released by the Pacific Maritime Association.)

Clearly, these expenses are higher than what is charged. Most likely, the terminal operator hides the cost to the line by creating an internal cross-subsidy with the vessel stevedoring. Some terminals have given up trying to defend the high expense of on-dock, and they rationalize on-dock as necessary to eliminate gate congestion which inevitably occurs immediately after the onset of vessel discharge.

**Railroad Expense**

Examination of expense incurred by the terminal operator is only part of the expense equation. Similar calculations need to be performed for the portion of the on-dock intermodal activity which is performed by the railroads.

These expenses traditionally have been ignored in any cost evaluation. At the onset, railroads varied widely in their level of acceptance on-dock. SP and BN were not early proponents of it, sometimes going as far as to refuse to handle international business unless it moved on one of their off-dock generic trains. UP and ATSF were willing to support on-dock because their west coast intermodal terminals lacked the capacity to handle additional business. In fact, by converting some existing business from off-dock to on-dock, these railroads were able to generate new terminal capacity “for free.”

During this initial period, railroads decided that relocating business to on-dock represented a net “wash” of expenses. Additional switching expense was offset by the reduced lift expense and foregone terminal investment. Such an over-simplified calculation no longer works, and several railroads are becoming much more stringent about on-dock operating parameters.
For the purpose of this study, railroad expense was calculated for switching, per diem and access.

Switching expense includes switching rail cars at the intermodal facility. This is an expense which is frequently underestimated. When planning operations, it is easy to assume a best case plan: a train arrives, is unloaded and reloaded, and it departs; But switching is very often incurred to rehandle empty cars due to delays or other operating problems. Bad order cars must be switched out as they occur, and often, terminals must switch to assemble an outbound train in block order. In some locations, switching is performed by outside entities. Elsewhere, the railroad provides switching, either with a road crew or a local switch crew.

Car hire expense constitutes another cost which is often underestimated. The critical cost factor here, besides daily rate, are the turntime and utilization. Turntime is how quickly the cars are reloaded. (Late vessel operations and access problems have often resulted in greatly increased turntime.) Utilization is how much of the car’s capacity is actually used. Today’s dis-aggregation of volume has harmed utilization.

Ironically, many railroads, after making huge improvements in car utilization over the past two decades, seem to have abdicated control over on-dock car utilization. Proliferation of double-stack destinations spreads the same volume over more destinations – and more rail cars. To minimize trucking expense, steamship lines seek to send loads to the rail destination closest to the delivery destination. And steamship lines, who control the on-dock load planning, now pay railroads per-container, so there is no incentive to optimize loading configuration, except during times of car shortages.

Access fees refer to charges for moving over portions of track. One railroad may charge another railroad for crossing its tracks (i.e., T-5 in Seattle) or entities may charge access fees to recover capital cost (i.e., Port of Portland, or the Alameda Corridor). Many ports contend that by charging the railroads instead of the line, the line does not incur the expense, but today’s railroads just pass along the charges.
Chart #3 shows the range of expenses and Chart #4 shows the percentage breakdown. Car hire is the predominant expense, but that is not surprising, given the magnitude of the expense.

**Conclusion**

Chart #5 shows the range of combined expenses and Chart #6 shows the percentage breakdown between terminal and railroad expense. It may surprise readers that the expense is contributed equally between railroad and terminal operations.

The heretofore assumed benefits of on-dock clearly beg further scrutiny – a challenging task, as it is imperative to establish a factual basis for cost and service comparison. Ports and steamship lines benchmark on-dock against other marine terminal activities (slow and expensive) rather than against other intermodal terminal operations (fast and inexpensive). Realistic comparisons need to begin.

On-dock is not going to disappear. But the industry cannot afford these high cost operations whether or not the costs are hidden and/or paid by another. For too long on-dock has been common practice but perhaps not a common-sense practice. We should now address the expense of this habit in a serious fashion.