Capital Efficiency of Facilities and Equipment

by
Wesley R. Kriebel
Managing Director
Research and Economics Division
American Trucking Associations, Inc.

This afternoon, I intend to partially put aside my role as a transportation economist and raise a few issues in the field of capital efficiency in the operation of motor freight transportation. This subject is very important because reduced capital efficiency in transportation is ultimately translated into higher freight bills in the food distribution industry.

Basically, I am asking you to consider the effects of efficient use of capital in three aspects of highway transportation; namely, physical facility location, facility throughput, and operations scheduling. In recent years, the economies inherent in these areas have been demonstrated in the operation of regional distribution centers. My comments will in no way do violence to this concept, but rather will be intended to extend it to what might be termed the "traffic jam" which sometimes occurs before and after goods move through such centers.

To put the conclusions ahead of the statement, the motor freight transportation industry, while not particularly capital intensive, must obtain the highest possible utilization of its investment. This investment in capital facilities consists primarily of truck tractors and trailers which now cost upwards of $75,000 per combination, and which have a normal first owner life of about four to five years. Coupled with escalating operating costs including driver wages, such an investment dictates that the trucking industry obtain the highest possible rate of utilization in order to minimize costs to customers.

Our experience indicates that some of the greatest opportunities for improved productivity and efficiency lie in reducing the time a vehicle is standing still waiting to be loaded and unloaded, or, rather similarly, when it is moving slowly in congested downtown traffic to and from a customer. Today, standing time for even a two-axle delivery truck can run up to 20 cents per minute. The costs for an over-the-road refrigerated combination might be double that amount.

One strategy utilized by the motor carrier industry in optimizing its capital efficiency involves what is generally known as the economy of agglomeration. We have observed that motor carrier terminals serve most efficiently when they are closely clustered together in a given urban area. Furthermore, our observations, buttressed by Federal studies, indicate that warehouses and distribution centers often locate in close proximity to such terminals, forming what might be termed "transportation parks."

The basic criteria for site selection for such agglomerations have been defined by an ATA staff member familiar

with this phenomenon in a recently published state-of-the-art paper. The time required to reach customers is considered more important than is the mileage involved in operations, and thus carrier terminals and distribution centers tend to cluster at or near the intersection of two or more Interstate or other major highways in a suburban location. Furthermore, the location chosen is normally on the side of a given urban area closest to the next urban concentration and/or the area of greatest growth and development. The advantages of such locational criteria are directly translatable into reduced capital costs for buildings and land, reduced taxes, improved traffic flow patterns, lower pilferage rates and a number of other similar factors--all when compared with central city locations.

Applying this motor carrier rationale to food distribution centers, the improvements in capital efficiency should be readily apparent. Extending them further, additional operating cost savings should also be expected to flow from such a locational selection in terms of reduced labor costs and the like. More important, when distribution centers are in close proximity to transportation facilities, the time and cost involved in obtaining and dispatching vehicles and freight is sharply reduced.

Moving on to the second area of improved transportation capital efficiency which might be utilized by the food distribution industry, I would like to discuss facility capacity. The principles of physical distribution management tell us that the best located and designed facility in the world will be a constant financial running sore if it has the wrong capacity. Just as too large a facility represents an uneconomic allocation of capital resources, an inadequate facility will always be operating beyond its capacity and thus at above optimum cost per unit of goods handled.

At this point, let me explain that distribution center capacity may be considered in two different ways. First, there is the capacity of the center to store and sort goods, the interior square footage. Second, and more important to transportation, is the capacity to move goods in and out of the facility. This latter has often been a problem with even the most modern warehouses and distribution complexes. The focus here is on the number and design of the loading doors or bays provided.

Fortunately, there is available a dock planning manual, prepared for The Operations Council of the American Trucking Associations and now listed as an American National Standard. This manual permits the designer of any freight handling facility to determine the number of doors or bays required under varying waiting time tolerances, given the anticipated total freight volume 20 years after completion. Obviously, the less waiting time desired, or the shorter queues which are considered tolerable, the larger number of doors. The manual also provides the architect with proper dimensions and clearances to accommodate present and anticipated future trucking equipment.

The payoff in capital efficiency in the utilization of this standard planning manual comes in the avoidance of physical bottlenecks at the loading docks, accompanied by costly delays to both you the shipper and to the freight carrier. The latter's increased costs will eventually be passed on to you in the form of higher freight rates.

Finally, there is the rather controversial subject of operational scheduling as a tool to improve capital efficiency. Regardless of how heavy or how large is the equipment utilized by the motor carrier industry--and improved vehicle sizes and weights will improve efficiency and help hold down freight rates--that equipment cannot operate at its optimum efficiency when it is waiting in line to load or to discharge freight. This wasteful waiting costs both the users and the providers of motor freight service untold millions of dollars annually. Further, it wastes energy, can add to air pollution and may contribute to traffic congestion in some areas.

Long waits for dock space can be partially alleviated through proper facility capacity and design such as I have described. But another source of the problem often lies with the shipper and receiver himself--in other words, with you. We have been told that many motor carriers could substantially reduce their capital investment in equipment and thus improve their capital efficiency if they were able to receive and deliver freight throughout the regular business day to all of their customers.

Instead, many firms insist on scheduled times for pick-ups and deliveries, while others will only receive or tender freight between certain limited hours--such as 11 AM until 1 PM. To explain the inefficiencies inherent in these systems, I must turn, in part, from capital efficiency to labor efficiency. Limited freight handling hours have been established by many firms in an effort to reduce their labor requirements. By utilizing the same personnel to handle over-the-dock freight part of the day as are assigned to inside warehouse duties the balance of the working day, total manpower requirements are reduced.

While this reduces labor costs for the user of freight services, it increases labor--and equipment--costs for the providers of these services. A motor carrier who serves a number of customers who have only limited freight service hours requires more equipment and more manpower than is optimumly efficient. To take an example, if a trucking company has forty customers who will accept freight only between 11 AM and 1 PM, that company might require ten vehicles to make deliveries. If, on the other hand, those customers would accept freight anytime between 8 AM and 4 PM, the trucker might be able to handle their business with as few as three vehicles. The same principle applies to pick-ups of freight.

The differences here may have been exaggerated slightly, but the possible added efficiencies are really significant. Dock congestion is reduced, capital and labor costs are lowered, and overall service levels are greatly improved. Looked at from your point of view you would be asked to add dock employees at perhaps $5 to $8 per hour as a trade-off for truck waiting time which we estimate at about $12 per hour for a pick-up truck and up to $24 per hour for a line-haul refrigerated combination. We believe that all would benefit by this trade-off.

To summarize, I am suggesting that there are several areas in which the food distribution industry and the motor carrier industry might cooperate in improving capital efficiency of both facilities and equipment through a better understanding of each others problems--and through the application of physical distribution management principles.