Equipment Location Systems—Providing Intermodal Terminal Operators with Information Accuracy

Ken Kelley  
Amtech Systems Corporation, 12984 Preston Road, 1-109, Dallas, TX 75252

Ali Boioglu  
NOW Solutions, 3235 Oster Road, Santa Clara, CA 95054

INTRODUCTION

The rapid growth of intermodal services as a critical factor in the transportation industry has made efficient intermodal operations a cornerstone for global transportation infrastructure. Research conducted by Mercer Management Consulting for the Association of American Railroads indicates that intermodal traffic will grow between 4.7 and 7.6% annually through the end of the century. With such amazing increases, questions arise concerning the efficiencies of intermodal operations. As one transportation company president explained, intermodal operations are similar to a relay team passing the baton between people who don't like one another.

Despite the difficulties, intermodal facilities are beginning to investigate methods for improving their efficiency. According to the Mercer study, advancements made in intermodal operations and infrastructure offer more cost-effective means of improving throughput in an intermodal facility versus increasing the size of a facility. In order to achieve these productivity gains and offer a new level of efficiency to carry intermodal operations well beyond the year 2000, operators must be supplied with the most advanced technological systems available.

An equipment location system (ELS) provides terminal operators with information, allowing intermodal terminal operators to achieve productivity gains and offer a new level of efficiency to carry intermodal operations well beyond the year 2000.

DEFINING THE EQUIPMENT LOCATION SYSTEM

Through a grant from the Cargo Handling Cooperative Program (CHCP), advanced technologies have been integrated to demonstrate the feasibility of an ELS to provide accurate real-time identification, location, and data communications. An ELS compiles terminal facility data in real time and supplies the information to terminal operators. The ELS does this by integrating automatic equipment identification (AEI), global positioning systems (GPS), and a wireless data communications network. With the information provided by the ELS, terminal operators are able to facilitate planning, management, and control programs that improve productivity and customer service. (Amtech Corporation of Dallas, Texas is the project manager and NOW Solutions of Santa Clara, California is the systems integrator for the CHCP project).

THE INTERMODAL DILEMMA

In any business operating as part of a global market, delays mean increased expenditures, reduced productivity, and lost revenues. For intermodal operations, delays affect every aspect of the transportation chain. When these costly delays are incurred at the intermodal yard, the reduction in efficiency is passed on to others involved in the process. The resultant system in which
the various parties working together in the intermodal facility do not operate as smoothly as possible with each other.

Improved management procedures and contributions by systems such as ELS can increase the capacity of available terminal resources and eliminate handling delays. Increased capacity, coupled with fewer delays, drive down intermodal facility operational costs exponentially.

**Improving Operations is Imperative**

As demands on intermodal terminals increase, a typical initial response to expand the facility. Although increasing the scope of the operation may produce some increase in throughput capacity, increasing the available size of a facility that is inefficient usually just creates a larger inefficiency. Terminal expansion, therefore, may not be the answer to improved operations. As the Mercer study concluded, "Internal operating and infrastructure improvements typically offer more cost-effective means of improving throughput capacity than facility expansion."

The average turn time for a drayage operator in an intermodal facility is 30-45 minutes (Figure 1). Waits as long as 90 minutes are not uncommon. With operating costs of about 45¢ a mile and overhead about $25 per load, total costs for a drayage operator exceed $40 per hour whether or not the operator is delayed with or without a load. Although most terminals have sufficient gate operations to avoid lengthy delays, unexpected paperwork problems can slow throughput, causing longer gate times and increasing the number of drayage operators being delayed. When terminal operations create delays (Figure 2), entrance wait time for drayage operators increases, reducing the cost effectiveness and synchronization of terminal operations. Lengthy queue times are costly, particularly in states such as New York, where charges are assessed every 15 minutes an operator exceeds a 45-minute wait limit.

Reduction in crane operations creates similar disabling characteristics for an intermodal facility. Crane operators average about 25 lifts per hour. With an increase of just one lift per hour, operators save $250,000 to $1 million each year (Figure 3). Because a crane operating at full capacity can complete a lift in about 5 minutes, cranes can achieve operations of up to 45-50 lifts each hour. Often, however, cranes are idle as operators wait for the appropriate container to be located, moved, and finally positioned prior to loading. If a crane operating team was able to double the average number of lifts per hour, the savings would be staggering.

By reducing the amount of time lost searching for specific containers, available parking slots, or empty chassis, productivity of the entire intermodal facility would improve. Time can be saved by increasing the efficiency of loading and unloading logistics and reducing the overall wait time for crane support vehicles. Container drayage schedules are improved and perfected through automation, among costly delays and improving turn times. Automated notification of dwell times typically peak on Friday and Saturday.