

- The pin puller walkway should be constructed on the right side of the hump lead.
- Wide track centers (19 ft) should be designed between the receiving yard tracks and between departure yard tracks.
- The departure and receiving yards should have a maximum grade of ± 0.15 percent.
- The car repair facility should be located

parallel to and between the classification yard and departure yard.

- The locomotive service facility should be located between the departure yard and receiving yard.

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Burlington Northern Railroad's View of Intermodal Hub Centers and Their Impact on Productivity and Customer Service

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ABSTRACT

Burlington Northern Railroad (BN) has almost completed the establishment of its network of intermodal hub centers. Since 1982, BN has consolidated 140 rail ramps into 20 hub centers and 21 satellites (some rail, some highway) while expanding the geographic scope of service. BN's hub centers are the key component in implementing two additional strategies: (a) new-technology rail and trailer equipment operating between hub centers on dedicated trains and (b) customer-responsive products and charges. BN hub centers are organized and used as marketing units rather than just as operating entities. Each hub center is regarded as an entrepreneurial joint venture, responsible for sales and pricing as well as operating and administrative functions. Hub center management teams make their own decisions to balance revenues and costs to improve the value of service to the customer and enhance the common profitability. Hub centers are demonstrably more productive than traditional ramps in equipment utilization and cost containment while simultaneously improving service to the customer. Hub centers not only have increased total traffic volume for BN, but also have made possible partnerships with motor carriers to produce new intermodal traffic that formerly moved only by highway. BN's hub centers are proving to be the type of decentralized, customer-responsive organizational structures needed to compete effectively in a deregulated environment, and they have produced a corporate culture conducive to manageability and commitment.

Burlington Northern (BN) began its intermodal hub center program in October 1982 with two pilot hubs at Minneapolis-St. Paul (Midway), Minnesota, and Portland, Oregon. During a 6-month test period, the intermodal growth rate for Midway was 40 percent and for Portland 60 percent.

This improved growth rate, gains in productivity, and better customer service were the primary reasons for BN's expansion of its hub center program. To date, BN has consolidated 140 rail ramps into 20 hub centers and 21 satellites (some rail, some highway) operating under the supervision of hubs and expanded the geographic area served by BN Intermodal.

BN hub centers consolidate high-cost, low-volume rail ramps into efficient shipping and receiving

depots for intermodal service. Because they are specialized and have new-technology rail and trailer equipment, BN hub centers generate enough traffic to justify dedicated train service connecting them.

Organized as marketing units under the leadership of managers with motor-carrier experience, BN hub center management teams are responsible for sales and pricing functions as well as operations and administration. This helps each manager and his team create customer-responsive products and charges while managing his business on a profit-and-loss basis. As a result, hub center management teams control most costs and revenues and are able to make trade-offs necessary to meet customer needs profitably and in an entrepreneurial manner.

OPERATIONS

The basic operating functions of the hub center are ramping and deramping trailers, equipment maintenance, and dock pickup or delivery within the hub market area as needed. BN hub centers have used the highway networks to expand their operations up to a 250-mi radius and reach customers never before served by the railroads. This expansion of market area allows BN to compete for a share of the more than 90 percent of all the trailer loads that move exclusively over highways and that otherwise would never consider using rail service.

It is important to note, however, that BN seeks to work in partnership with motor carriers. The key is to find situations where intermodal transportation simultaneously benefits BN, the motor carrier, and the customer. For example, many regional truck lines have 48-state operating authority but no effective way to exercise it. BN can arrange either to pick up the load at the shipper's door or to deliver it to the receiver's door in cooperation with a regional motor carrier who completes one portion of the haul.

Another example in which BN works together with motor carriers is trailer utilization. By finding situations that are backhauls for BN and headhauls for the motor carrier, equipment and rate packages can be fashioned that benefit both the transporters and the customer as well. This type of situation works within the confines of the hub center's 250-mi radius or between hub centers. In either case, it produces a system where trailers rarely run empty and tractors rarely bobtail.

SALES

Each hub center has a sales manager to assist the hub manager in assessing and meeting customer needs. The sales manager

- Develops and implements profitable sales plans,
- Has direct responsibility for key accounts,
- Supports other sales personnel with accounts within the hub center's radius, and
- Establishes programs and product packages to develop new business.

PRICING AND ACCOUNT MANAGEMENT

Hub center management teams are empowered to negotiate rates and custom-tailored packages of options and prices with individual customers (noncontract patrons). Although sales teams are provided with floor rates for both rail and highway movements under which they may not quote without consultation with BN Intermodal, each team is essentially free to tailor packages of options and pricing without corporate-office ratification.

This decentralized marketing structure is vital to BN's efforts to provide customer-responsive products and charges. Experience has shown that consultations with BN Intermodal are rarely needed and that monthly profit-and-loss statements and other indicators provide adequate monitoring of the system.

In addition to the sales force operating in the hub centers, BN continues to have account managers at both regional and system locations for those customers who need them. Also, BN currently is implementing a ZIP-code pricing structure to make it more convenient for customers to use BN Intermodal.

ADMINISTRATION

All clerical functions, including reporting and billing, are consolidated in the hub centers. This provides optimum response to customer needs as well as improved teamwork and overall business cohesiveness. Clerical functions are being automated as quickly as possible to free administrative personnel to work on solving potential customer service problems before they actually occur.

ASSESSING PROFITABILITY

Because the hub center management team has direct responsibility for both structuring the product and pricing it, a monthly profit-and-loss (P&L) statement is used to measure cost and revenue at each hub center. The P&L statement

- Is computer-generated;
- Is done on a marginal cost basis;
- Portrays revenue to and from each hub center, with attendant expenses (both line-haul and hub-center-specific), so that each hub center management team can gauge the effectiveness of product and pricing decisions; and
- Provides an accurate picture of cost containment, quality of revenue, and return on assets to hub center management teams closest to customers and best able to react to market needs and changes.

HUB CENTER RESULTS

BN's hub centers have played the key role envisioned for them in implementing the new-technology and dedicated-train and customer-responsive strategies. Their combination is producing a synergism in which each strategy enhances the others' effectiveness and growth.

For example, BN currently is running 10 dedicated trains, compared with four 2 years ago. More than 300 new-generation rail platforms and 1,500 new trailers (102 in. by 45 ft) equipped with BN's new innovative floor tie-down device have been acquired.

Significant rates of growth have been achieved, thanks largely to hub center operations. Between 1982 and 1984, hub center strategies and the intermodal team produced a 40 percent growth in volume. In 1984 alone, volume was up 25 percent. It is important to note that the large portion of this growth is from new intermodal traffic that was converted from what was previously all highway movement through partnerships with motor carriers.

The hub centers have contributed to better and more reliable service by BN Intermodal by providing mechanized lift capability (including the ability to lift privately owned trailers not equipped with lift pads), plus reduced potential for loss and damage due to the reduced slack action of the new equipment and dedicated intermodal train operations that avoid classification yards.

In the area of equipment utilization, the hub centers have increased BN's hitch utilization ratio 15 percent, despite the complexities of matching varying trailer lengths and destinations. As a result, fewer railcars are handling more units, with commensurate per diem expenditure reductions. Also, BN's trailer fleet utilization rate has improved.

The hub centers also have helped control and contain BN's costs of improving customer service. The substitution of highway for rail-feeder service within the 250-mi opportunity radius surrounding

each hub center has produced equipment per diem savings that more than offset the increased highway drayage costs. Using a competitive bid process for drayage and ramping services has controlled the cost of providing these services, thereby expanding BN's competitive range.

Finally, the hub centers have helped BN to improve its corporate culture both organizationally and philosophically. Each hub center is very much an individual entrepreneurial joint venture, responsible for its product and profit. Line personnel have a high degree of autonomy in their tasks. Basically, they are asked only to do their best and to produce a product that works and is profitable.

Hub center team members have responded in very positive ways. For example,

- Hub center personnel helped design BN's new floor tie-down system for trailers;

- Hub center personnel invented lift shoe adapters that permit older lift devices to handle wider trailers plus enable all BN lift equipment to safely handle privately owned trailers that do not have lift pads;

- Hub center personnel adapted weight scales from the logging industry to intermodal use, so that each unit is weighed as it is lifted;

- Hub center personnel have absorbed a near doubling of business volume without requiring additional help; and

- Quality personnel are trying to be transferred into the hub centers, not out of them.

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New Concepts in the Control of Train Movement

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ABSTRACT

The concepts on which the Advanced Train Control Systems project is founded are described. These are of two kinds; there are the technical concepts on which the systems will be based and the organizational principles that permit the North American railroad industry to initiate a quantum improvement in this specialized technology. Both are described. The Advanced Train Control Systems project is a cooperative endeavor on the part of the railroad industry to control the use of their resources in a more cost-effective manner. The substantial increases in the productivity of labor and capital to be expected from their use will include savings in fuel, maintenance of rolling stock and track, and savings from the better utilization of motive power and cars as well as from the increase in route capacity obtainable at any level of investment in track. The project constitutes a step in the direction of automation.

The concepts described in this paper may be new, but the notion that productivity in industrial countries should follow a long-term rising trend--albeit an intermittent one--is as old as the Industrial Revolution. It is as old as the idea that the progressive advance in science should enable the industrial work load to be accomplished with a decreasing proportion of the time of the work force and increase leisure time and free labor to make new products.

The history of transport in general and of railroads in particular is one of increase in the productive use of labor, material, and resources. The railroads of the United States and Canada have already achieved a high level of efficiency in these areas and this observation extends to the central train control (CTC) signaling that is in general use. On the two major Canadian railways, for example, the productivity of labor in all trades in-

involved in transportation in man-hours per gross ton-mile moved has grown at an average rate in excess of 6 percent per year since 1968. It must be added that increasing lengths of haul and the proportion of traffic made up of large unit trains of bulk freight have contributed to this surprising statistic.

However, some are concerned that many of the sources of technical advance that have served well over many years are nearly fully exploited. By the end of the decade, a technical plateau may well have been reached from which further progress in these areas would be both costly and difficult to achieve.

During the last decade the Track Train Dynamics program of the Association of American Railroads (AAR) has thoroughly explored the means of squeezing the last modicum of reduction in specific resistance to traction through improved metallurgy, track lu-