# Keeping Logistics Under Wraps

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October 2005

## 1 Company Background

Stationery Demand is a national distributor of customized paper goods and office supplies located in Blawnox, Pennsylvania. The company was founded in 1963 by John Karthan, a former Westinghouse engineer who left the nuclear business to satisfy his entrepreneurial fervor. From the company's earliest days John emphasized personal interaction with his customers, often making evening sales calls himself at the home of other small business owners. As more companies saw the value of placing their logo on stationery and other office supplies, Stationery Demand's business grew exponentially in the 1970s and 1980s. John hired a large sales force to serve the new customers and expand the business to geographical areas outside of Western Pennsylvania. He required that these salespeople complete an extensive training program to ensure that they exemplified his personal selling philosophy.

By 2005 Stationery Demand had a national presence and annual revenues exceeding $30 million. Control of the firm passed to John's son, David Karthan, in 1992; and in order to raise capital, David transformed the proprietorship into an S Corporation in 1996 by offering shares of stock to selected investors. Before retiring, John converted his sales force into a network of independent distributors in order to provide extra sales incentives and reduce his company's benefit obligations. Stationery Demand currently has approximately 400 of these independent distributors, each serving a small portion of the United States.

John Karthan clearly defined his company's customer base early on in its operations. He focused his sales efforts on small business owners like himself that larger office suppliers might ignore. The personal sales approach established trust quickly, as his customers felt like their business was valued since they were dealing directly with the owner. This provided another impetus for the decision to transform the salespeople into independent distributors. Karthan hoped, and ultimately found, that his distributors could provide a competitive advantage in landing new accounts by reflecting this same interest in the customers.

## 2 Existing Distribution Network

As his business expanded across the country, John Karthan had to develop a distribution network able to support his dealers. Each local distributor, armed with a catalog of available products and a briefcase full of samples, makes contacts with small business owners. They transmit orders to the order management department in Blawnox, who then inserts the order into the production schedule. All of Stationery Demand's materials are purchased from traditional office supply manufacturers; Stationery's factory simply emblazons the customers' logos and addresses onto the purchased products.

Once the orders are completed, they are shipped to the dealers immediately. Transportation is made via U.S. Package Express (USPE), a national parcel carrier known for its exceptionally high service quality. Stationery Demand had used many parcel carriers, including the U.S. Postal Service, in the past; but all of the others resulted in an unacceptably high rate of damaged and lost shipments. Even though USPE charged more than these other carriers, Stationery's management remained unwavering in its commitment to USPE, claiming that the total cost of using the carrier (including repair, replacement, and administrative costs) was lower than its competitors.

The dealers themselves make the final delivery to the customers upon receiving their shipments from the home office. This provides the opportunity for the dealers to ensure that the customers are satisfied with the quality of their order, sustaining John Karthan's commitment to customer satisfaction and his personal selling philosophy. It would definitely be quicker for Stationery Demand to ship the goods directly to the customers, but almost all of the customers in the past have been willing to accept a later shipment because they appreciate the interaction with the dealers and Stationery's combination of low prices and high quality products.

## 3 Transportation Contract Renewal

In July of 2005 Stationery Demand's annual transportation contract with USPE was due to expire. Mark Grescovich, Stationery's traffic manager, received the proposal for renewal in April. Like other parcel carriers, USPE establishes its transportation rates by zone, increasing with the consignee's distance from the shipping point. Grescovich noticed that the rates in the proposal exhibited only slight increases over the previous year's rates in zones 1-6, but the rates for zones 7 and 8 (destinations west of the Rocky Mountains) were appreciably higher than before. He did a little research on USPE's website and found that these proposed rates were even higher than a residential shipper would pay without a contract.

Unable to identify a reasonable explanation for this radical increase in price, Mark Grescovich contacted his sales representative with USPE. She claimed that the proposal was a result of demand patterns over the past several years. USPE had seen a large spike in shipments to the West Coast; consequently, their capacity in the area was stretched to its limits—hence the increase in price. Something about that explanation did not sit well with Mark, though; he felt that USPE might be exploiting their knowledge that Stationery Demand would probably not switch to another carrier regardless of the rates they charged.

In order to determine an effective response to this proposal, David Karthan formed a committee, headed by Mark Grescovich, with representatives from other functional areas in the company such as production, procurement, and several of the independent distributors on the West Coast. This was consistent with David's newest initiative of decentralizing the power structure in Stationery Demand and eliminating the traditional functional silo hierarchy. The collaboration between departments was meant to ensure that any recommendations would not improve one functional area's operations at the expense of the others. The committee's challenge was to propose a redesigned distribution network that incorporated the new USPE rates and preserved the final delivery of orders by the dealers while reducing the distribution costs in the face of the increased rates.

## 4 Distribution Network with Zone Skipping

After several weeks' brainstorming and deliberation, the committee conjectured that Stationery's best course of action was to simulate a crossdocking operation by employing a logistics strategy they dubbed *zone skipping*. Establishing a distribution network with zone skipping, Stationery Demand

Table 1: Distributive Justice facility locations available for the zone skipping operation

| Location | Zip Code | Truckload Rate | Handling Cost per Shipment |
|---|---|---|---|
| City of Industry, CA | 91789 | $1.10 | $1.14 |
| Coos Bay, OR | 97420 | $1.10 | $1.27 |
| Laughlin, NV | 89029 | $1.40 | $1.23 |
| Preston, ID | 83263 | $1.35 | $1.30 |
| Tuba City, AZ | 86045 | $1.25 | $1.19 |
| Vacaville, CA | 95687 | $1.10 | $1.36 |
| Walla Walla, WA | 99362 | $1.10 | $1.08 |

would set up pool points in West Coast areas with high demand concentration. Shipments bound for these destinations would be sent on pallets at the end of each week via a truckload carrier from the Blawnox facility to the pool points. Once they arrived, the pallets would be broken down and the individual shipments sent to the distributors via USPE according to the carrier's general rate tariff.

Essential to the zone skipping strategy is the packaging of the parcels. The cartons could not have any markings signifying that they were shipped from Stationery Demand, otherwise USPE would charge the high rates that they quoted in their proposal. Stationery must label the shipments as if they were originating at the pool points and were property of its operator. Mark Grescovich has some concerns about the strategy, though, because he recalls that Stationery Demand's contract terms with USPE imply that USPE will be Stationery's sole source of finished goods transportation unless they do not have the capability to transport a particular shipment. Mark is sure that USPE would be irritated if they found out about the zone skipping operation, which would subsequently endanger Stationery Demand's relationship with the carrier.

As goods are produced, the shipments would be aggregated with others destined for the same pool point. The factory has a small, short-term warehousing area where these orders could be stored and palletized. The committee acknowledges that the zone skipping strategy will increase the customers' order fulfillment time, but they do not anticipate that this increased service time will significantly impact sales in a negative way based on the input from the independent distributors on the committee.

Through a prior business relationship, one of the members of the committee identified a third-party warehousing firm on the West Coast, Distributive Justice, that had the spare capacity to accommodate the zone skipping operation. In fact, they have another customer in the Greater Pittsburgh area that sends weekly shipments to the Distributive Justice facilities. This other company only requires half-full truckloads and has offered to their operations with Stationery Demand. Table 1 contains a list of the Distributive Justice facilities that are available for the zone skipping strategy. (See Figure 1 for a graphical representation of these potential locations and their position relative to the Blawnox facility.) Distributive Justice will charge Stationery Demand a fixed, annual setup and maintenance fee of $40,000 per facility used in the network to cover its systems configuration requirements and labor training to perform the zone skipping operation. They also require a facility-specific fixed fee per parcel shipment in return for their labor and administrative services. This fee is based on each facility's available capacity; thus, busier facilities charge a higher fee per shipment. These charges, along with Stationery Demand's quoted rates per mile for truckload transportation from Blawnox[1] to each location, are also provided in Table 1.

[1]Blawnox, PA, has zip code 15238.

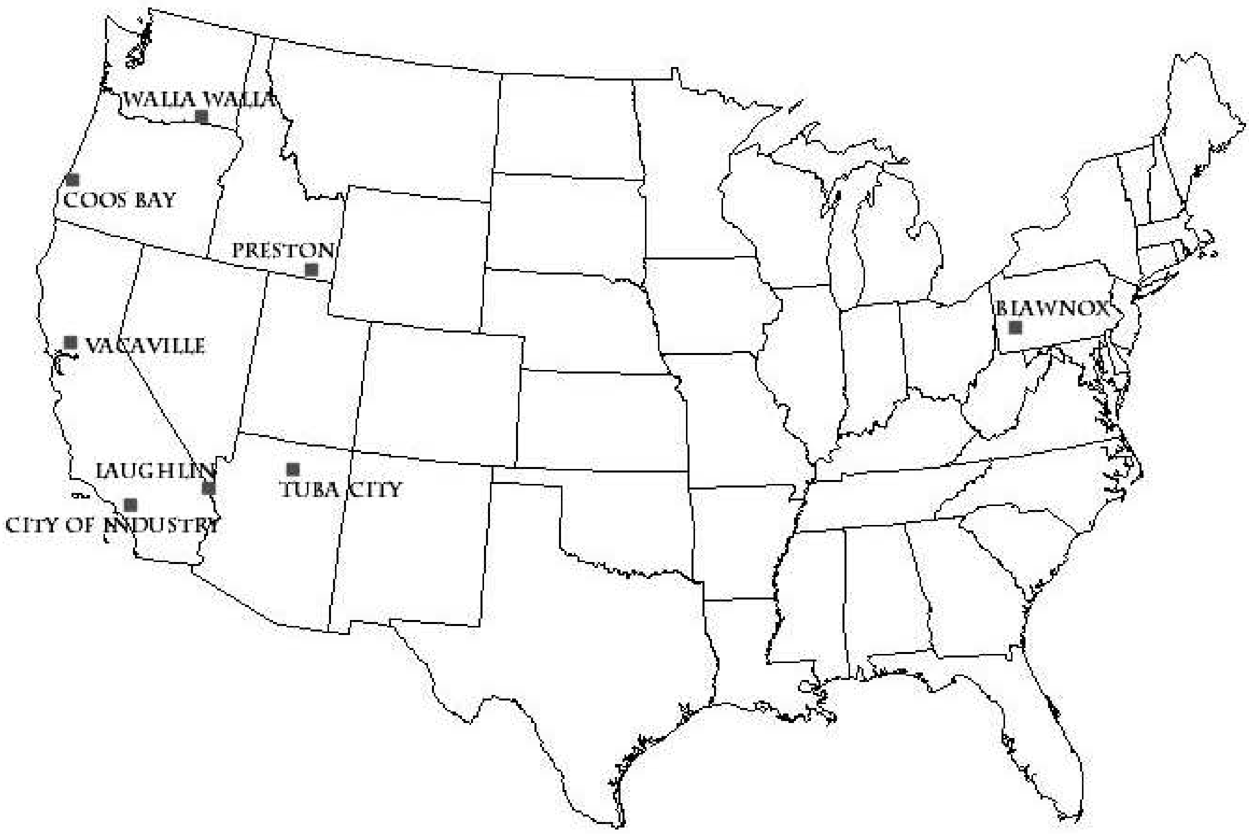


Figure 1: Geographical position of Distributive Justice facilities relative to Blawnox, PA.

## 5 Required Analysis

You are a transportation analyst for Stationery Demand working in the traffic department under Mark Grescovich. Mark has put you in charge of analyzing the committee's claim that zone skipping would be a profitable strategy. Furthermore, he wants you to determine which of the Distributive Justice facilities should be utilized and which distributors these facilities should serve. It is possible that zone skipping is not viable for some shipments, especially those in geographically-isolated locations or where demand is particularly sparse. Thus, you can assign each distributor location to either one of the Distributive Justice facilities or to be served directly from the Blawnox facility.

Since Stationery Demand ships to a fixed set of distributors, the shipping destinations remain constant from week to week. Demand for customized stationery and office products is relatively free from seasonality and exhibits little in the way of trend; therefore, it suffices to annualize[2] a representative week's worth of sales data to make design recommendations. Mark has provided the following data to be used in your analysis.

- The spreadsheet `Sales Data.xls` contains historical parcel shipment data for the period of April 10-17, 2005. All of these shipments originated from the Blawnox facility.
- The spreadsheet `Distributor Zones.xls` identifies the USPE zone in which each independent distributor lies for shipments originating from Blawnox and the seven proposed Distributive Justice facilities.

[2]That is, you should assume that the given week's shipments occur each week throughout the year.

Table 2: Proposed USPE parcel rates by zone

| Zone | Rate per Pound | Minimum Charge |
|---|---|---|
| 2 | $0.28 | $4.00 |
| 3 | $0.32 | $4.30 |
| 4 | $0.35 | $4.65 |
| 5 | $0.40 | $5.00 |
| 6 | $0.45 | $5.45 |
| 7 | $0.58 | $6.30 |
| 8 | $0.70 | $7.40 |

- Each distributor location is to be served by only one method of transportation (i.e. either direct from Blawnox or through one of the Distributive Justice pool points).
- Since Stationery Demand's products are generally very dense (e.g. paper, envelopes, desk accessories, etc.), the traffic department can characterize the capacity of a truckload trailer by the allowable weight. The weight constraint will be eclipsed long before the trailer is physically filled with cartons. For this analysis you are to assume that a standard 48' trailer is allowed to carry 40,000 pounds of freight; since Stationery Demand is sharing the trailer's capacity with another firm, they can load a maximum of 20,000 pounds of freight on each trailer.
- Several years ago the Stationery Demand traffic department conducted a logistics cost analysis and found that even though parcel rates[3] generally depend on multiple shipment parameters (such as weight, volume, and density), Stationery's shipment consolidation efforts resulted in a freight charge that was approximately linear with the shipment weight. Mark has authorized you to model the parcel freight cost this way for this network analysis. Table 2 contains the new USPE parcel rates per pound for shipments originating from Blawnox and the minimum charge per shipment by zone.
- Table 3 contains the published USPE tariff converted to a cost per pound. These are the rates that will be used[4] if shipment to the distributor is made via a Distributive Justice pool point.
- Truckload costs[5] will be split equally between the two companies, regardless of the actual capacity distribution.

# 6 Case Requirements

1. Evaluate Stationary Demand's total annual distribution cost under the current network design (where all shipments are sent via USPE from Blawnox to the distributors).
2. Design the optimal configuration of a distribution network incorporating zone skipping. That is, identify the Distributive Justice pool points that should be utilized, determine how each distributor location should be served (either direct from Blawnox or through a pool point), and compute the total annual distribution cost of this network design.

[3] Compare this to rates for truckload freight which, as you may recall, are quoted on a per mile basis.

[4] Recall that these packages cannot have any marks denoting that they come from Stationery Demand. Consequently, they cannot take advantage of the the low Stationery Demand contract rates to zones 2-6.

[5] Use Blawnox (zip code 15238) as the origin point when calculating the truckload costs.

Table 3: Published USPE parcel rates by zone

| **Zone** | **Rate per Pound** | **Minimum Charge** |
|---|---|---|
| 2 | $0.33 | $4.20 |
| 3 | $0.37 | $4.65 |
| 4 | $0.41 | $5.00 |
| 5 | $0.46 | $5.40 |
| 6 | $0.50 | $5.85 |
| 7 | $0.54 | $6.10 |
| 8 | $0.59 | $6.45 |

3. Prepare a two- to three-page memorandum addressed to the interdepartmental committee headed by Mark Grescovich that provides the following:

   a. Identify the stakeholders in the decision to redesign Stationery Demand's logistics network.

   b. Propose several possible courses of action that Stationery Demand could undertake in response to the new USPE rates.

   c. Determine how each stakeholder will likely be affected by each potential action.

   d. In light of these potential effects on the stakeholders, identify the most important factors that the committee should consider when they make their decision.

   e. Provide your recommendations about the actions the committee should take in redesigning the distribution network.

   f. Explain why you reject the other viable alternatives that you proposed earlier.