

## Alexander & Thurston: Inventory Management

### Background

Alexander and Thurston, Inc. sells complex mail sorting equipment to utility companies, insurance firms, and other organizations in the US with high-volume mailing requirements. Most of the customers also purchase some kind of service support from A&T. Typically, the service contracts guarantee that downtime will be no more than a certain number of hours per year. Some of the larger customers have inventory and A&T maintenance personnel on site in support of these contracts. Most customers, however, have their equipment serviced by regional technicians.

Repair technicians service customer sites (*S*) by working out of regional facilities (there are roughly 60 facilities across the country), which carry inventories of spare parts. When a facility (*F*) needs replenishing or when a technician requires a part not available at his/her facility, an order is placed to a distribution center (DC) located in Chicago (**Figure 1** illustrates a portion of this distribution network). If the order is for an emergency repair, it is sent out via overnight mail. If the DC is unable to fill an emergency order, a customer's machine may be down for a long time while the DC waits for the required part to be replenished by internal production or receipt of an order from an outside supplier.

Because of pressure to live up to the service contracts, facilities are evaluated primarily in terms of customer service, which is measured in the number of hours of downtime experienced by customers. This downtime includes time spent waiting for a repair technician to arrive, time spent waiting for a repair part, actual repair time, and anything else that prevents the customer's equipment from functioning.

Inventory levels have traditionally been of secondary concern. To support the facilities, management evaluates the DC in terms of fill rate (i.e., fraction of orders met from stock within 24 hours). Recent fill rates for the DC have been around 85%, although upper management feels that this could be improved to over 90%. (Note that not all service "hits" are due to a lack of inventory. Sometimes they are caused by a heavy backlog of orders, keying mistakes, misplaced inventory, and other factors that lead the DC to fail to fill an order from a facility within 24 hours, even though it had the required inventory in stock.) The DC manager, who is nominally in charge of all inventory in the system, is also held responsible for inventory

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