CHAPTER 3

PACKAGING, STORAGE AND SHIPPING COST

CHAPTER OUTLINE

CHAPTER SUMMARY

In this chapter we will focus on the cost associated with the components size, packaging, and storage.

I) PACKAGING, STORAGE AND SHIPPING COST

Packaging should be given important consideration during the design of everyday items. Characteristics such as geometric envelope and stowability of a design can have wide ranging repercussions on customer satisfaction, warehousing, and shipping. Consider the type of chair used in venues such as convention centers. These halls have to be configured for events ranging from lectures to meals to open spaces. Also, consider the journey of such a chair beginning from the moment where manufacturing ends to the moment when the chair reaches its end of life. Upon exiting the manufacturing floor, that chair is shipped to a warehouse and stored as inventory pending sale. Once sold, the chair needs to be shipped to the customer (let's say a hotel that bought several hundred chairs) where it must be unloaded, unpackaged, and stored. That chair is transported between the hall and the storage area several thousand times before it reaches its end of life.

II) INVENTORY COST

Inventory cost is the cost of storing a product for the period after manufacturing and before sale. Inventory cost involves many aspects including taxes, insurance, and depreciation among others. The one aspect of inventory cost relevant to this discussion is the cost of warehousing. Warehouses are sized by volume and floor area and not by their ability to carry weight. Thus, the smaller the packaging envelope of a product, the cheaper it is to store it as inventory.

III) TRANSPORTATION COST

Transportation cost is the cost of shipping a product. The majority of shipping within the mainland US takes place by truck, and thus will be the principal consideration here. Shipping cost is determined largely by density, which is the total weight of an object divided by its total volume. Weight, without consideration of volume, only dominate in the case of really heavy objects. The sight of a flat-bed truck rolling on the freeway with a single roll of sheet steel is a case in point, causing the truck to reach its maximum weight limit or carrying capacity. However, for the most part, volume plays a critical role. With regards to the event chair example, consider a design where each chair has its own box, say a 2x2x6 ft. enclosure of 24 ft^3, and the truck has internal space of 3000 ft^3. Such a truck can carry a maximum of 125 chairs which, from a cost standpoint, is rather poor. Now consider a similar chair but one which stacks very efficiently such that 10 chairs can fit in that same 24 ft^3 box. The same 3000 ft^3 truck space can carry 125 boxes totaling 1250 chairs. That same truck is able to transport ten times as many chairs in a single haul. Given that shipping cost includes a number of fixed costs (driver, truck depreciation, truck maintenance, dispatch center, etc…) and one variable cost (diesel), the cost per

chair of shipping the stackable chairs is several times lower than shipping the ones that don’t stack.

IV) CUSTOMER SATISFACTION

Consider the troubles that would have befallen an event hall manager if he or she has purchased a thousand chairs that did not stack. That manager will have to hire more people to set up the same number of chairs and will have to find a large storage area. The cost in space and personnel over the life of the chairs will be so high that it would be cheaper to purchase new ones.