

A C K E R M A N  
**WAREHOUSING  
FORUM**

*The industry publication dedicated to helping warehouse managers and their bosses improve productivity and manage more profitably with tips, comments and articles written by practicing professionals.*

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## *The Fundamentals Of Warehousing*

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*Editor's Note: If you are an experienced warehousing professional, we did not write this article for you. We wrote it for the many people who are newly involved in warehousing and logistics management. Whether the newcomer is your boss or a recently hired staff person, this writing should assist you in describing the warehousing function. KBA*

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In essence, the prime function of warehousing is the management of space and time. The space is always limited, and therefore the good operators use the available space effectively. The time is labor, which is significantly harder to manage than space.

The earliest known uses of warehousing were to serve as a reservoir or a hedge against uncertainty. Some of the oldest writing in Western civilization, the book of Genesis, describes the role of warehousing to prevent famine in ancient Egypt. This provides good evidence that warehousing is one of the oldest commercial activities known to man. Warehousing is done for many other reasons but today, there are situations where the prime function is still the same as that described in the Bible.

As modern methods of transportation developed in the 19th and 20th centuries, warehousing was used as a means of achieving transport economies. The two functions of consolidation and distribution are both used to reduce freight costs. In each case, a substantial amount of material is gathered to create a bulk transport load rather than a small one. Warehousing is used at either end of the process as the gathering point or the distribution point.

In the distribution function, warehousing may also improve customer service. If the distribution center is closer to the customer, it can provide better service. The proliferation of distribution centers in the 20th Century has largely been an effort to improve customer service. On the other hand, the substantial improvement in delivery capabilities through the use of overnight air transport has made it possible for some distributors to substantially reduce the number of distribution centers without compromising customer service.

### ***The Challenges Of Space Management***

If buildings were made of elastic, space management would be easier. Unfortunately, some managers act as if they believe warehouses can be stretched. Yet overcrowding is the worst thing that happens to a busy warehouse. When the capacity is reached, material is stacked in aisles,

truck docks and staging areas. The result is chaos.

There are several safety valves which should be used to prevent overcrowding. The first is outsourcing, or diverting material to a third-party warehouse. Another option is to lease old highway trailers and use them for storage. In some cases, materials can be stored outdoors on paved parking lots. Very slow-moving or inactive products may be mixed together to save space.

Space management can be substantially facilitated by the use of a stock locator system. In today's computer age, most people assume that hardware and software are necessary, but in fact we had locator systems long before we had computers. While the computer is valuable, warehouse discipline is an absolute necessity. A locator system requires maintenance by everybody working in the warehouse. When material is put away, the correct location must be recorded. When a location is found to be empty, this fact must be reported. When two short rows are combined to save space, these changes must be placed into the system. Failure to do any of these steps will cause the locator system to deteriorate.

There are both fixed and random locator systems. In the fixed system, space is reserved for each item on a permanent basis. The random system allows people to select a location for each item, and random systems certainly work best with computer support. The compromise is a combination, using fixed locations in an order pick line and random locations in the reserve storage areas.

Locator systems can be used to control items which normally ship together. If SKU No. 123 is nearly always shipped with SKU No. 987, it is more efficient to store these two items together. On the other hand, if there are two SKU numbers which have proven to be error prone, the risk of mis-shipment will be reduced by always storing them far apart, or even in different buildings. Items requiring high security should be stored in the most secure places in the warehouse. If quality-control needs require a quarantine of newly manufactured product, the locator system can be used to control this process.

The best use of locator systems requires good planning. In a surprising number of warehouses, the inbound location decision is "operator controlled", which means that the forklift operator decides where to put the inbound material. While good warehouses usually have very talented lift truck operators, most of them are not trained in space planning. The natural result is a poor storage layout.

The locator system can also prevent shipping errors. Under an ideal management system, the order picker is sent to location X-10 first, and then told that at that location item 123 will be selected. If the correct item is not at that location, there is something wrong. When both the location and the item are used in selecting orders, the possibility of picking errors is greatly reduced.

### ***The Problems Of Managing Time***

The science of time study engineering was developed earlier in the 20th century, and for a period of time the practice had a poor reputation. Back in the 1930s, the legendary movie comic Charles Chaplin produced a film that showed assembly-line workers racing to keep up with the machines. An adaptation of this comic routine is still seen in a television commercial. Today, relatively few workers will react negatively to time study activities.

Time study is particularly difficult in a large warehouse complex, because workers are moving all over the building and it is not easy to track and observe all of their activities. Yet it is necessary for warehouse managers to know approximately how long the job will take. Third-party operators must create fees for their services which will generate a profit, and those fees should be primarily based on the time needed to get the job done. Customers of those third-party warehouses also need time measurements, primarily to confirm that the charges they pay to the warehouse operator are fair and reasonable. Private warehouse operators also need to understand unit costs in order to be sure that a true cost for warehousing is built into the “cost of goods sold” used by the accountants. Because managing time in a large warehouse is difficult, the majority of warehouse operators today do not have a sufficiently precise means of measuring unit costs for the warehousing function.

Nearly every warehouse measurement method relies on collaboration of the workers. If the workers want to fool the system, they will probably find a way to do so. However, it is possible to achieve good cooperation by pointing out that accurate measurements are necessary if the company is to maintain profitability and job security in a competitive environment. Most of us were raised with the Puritan work ethic which is part of American life. From our earliest childhood, we were taught that it is good to stay busy, and that being productive is important. The great majority of workers in our culture hope to go home after work feeling that they did a good job. Fortunately, these people will cooperate in measuring productivity as long as that measurement is not perceived as a means for taking disciplinary action.

Productivity and quality are closely related. If the job is not done properly, it must be done over again, and then productivity suffers. If you make shipping errors at the warehouse, the suffering is done by customers.

All measurements of productivity must also consider quality. The lift truck operator who handles more product than any other employee, may also be the one who causes the most damage. On the other hand, measures of quality must also consider productivity.

### ***Defining And Measuring Quality***

Housekeeping has always held a position of extreme

importance in judging warehouse managers. Housekeeping creates a psychological impact, and poor housekeeping creates extra costs through damage, accidents and mis-shipment. If you have doubts about the quality of housekeeping in your operation, consider this question: Is there any section in your warehouse today that you would be ashamed to show to your largest customer?

Timeliness and accuracy in the receipt of product is critical. Therefore it is important to track the time elapsed in moving from “dock to stock”. Many shipping errors originate through poor receiving. If two items are randomly mixed on a pallet, there is a high probability that there will be errors when the merchandise is shipped.

Shipping accuracy may be the most critical measure of quality-control. In extreme cases, the customer is lost. Since job security for most of us depends upon the presence of contented customers, shipping errors can be fatal.

Order fill rate is another quality measure. If the item is not in the warehouse, the order cannot be filled.

In measuring product damage, it is important to relate damage to activity. One branch warehouse may have more product damage than a similar branch in another city, but the amount of damage should be calculated as a ratio of the number of tons moved through that facility. In other words, damage and errors should be calculated as a percentage of items handled.

### ***Connectivity***

Ultimately, the role of the warehouse is to support the corporate mission. The way that warehouse is managed will depend on whether your prime goal is growth, superior service, cost cutting or improvement of production.

The warehouse manager in a growth oriented company will be judged by ability to meet peak shipping needs, capability of meeting seasonal or annual surges in volume, and the ability to find additional space or additional workers on short notice.

In a company where customer service has top priority, the warehouse is judged by its ability to provide service that is superior to the competition.

In some organizations, controlling or reducing costs is the primary mission. In such organizations, the warehouse manager will be judged by ability to reduce freight costs or perhaps to reduce overall warehousing cost.

In the production oriented company, a prime function of warehousing is to improve manufacturing effectiveness by storing production overflow or staging inbound materials efficiently.

As you appraise your warehouse, ask four questions:

- How well does it support the corporate mission?
- How does the operation compare with other warehouses elsewhere in the company?
- How does it compare with competition?
- How do the results compare with last year?

Because the warehouse frequently serves as a link between production and the consumer, your understanding of your firm’s goals will allow you to maintain the connectivity which is a vital factor in your success.

# ***KEN'S COMMENTS***

## ***Warehousing In the Post- Industrial Age***



Business history reminds us of how the three revolutions have changed warehousing.

The first industrial revolution was marked by the introduction of water and steam to replace people and animals as power sources. As factories were developed, there were new opportunities for people to work outside their homes. Warehouses were reservoirs to handle the variations between production and demand.

Decades later, a second revolution was stimulated by improvements in transportation and communication. In the U.S., the transcontinental railroad allowed inland

transportation coast to coast. Construction of the Panama Canal saved time and money in water transport. Wire communication allowed information to be transmitted at lightning speed. As railroading reached its zenith, warehouses were located at railroad terminals and provided storage-in-transit as an accessory to rail transport.

With the arrival of the information revolution, corporations are changing again. While the cost of physical movement continues to rise, the costs of computing and communicating are reduced. Technology allows us to process and communicate data at a much lower cost today than ever before.

Information has changed warehousing more than the other revolutions. It is hard to find even a small warehouse that does not have a computer and a Warehouse Management System. Because information has improved inventory management, warehouse operators hold stocks which turn faster than ever before.

When we understand how warehousing is part of business history, we are better able to predict the changes which will come in future years.

## ***WAREHOUSING TIPS***

### ***When Is A Warehouse Too Full?***

Though little has been written on the subject, warehouse professionals generally agree that a warehouse which is 100% full is too full. In his Logistics Rules of Thumb, author Dick Morreale states that productivity will decrease by about 25% on any warehouse which is over 85-90% full. In the same publication, Bill Wisner states that bulk storage and drive-in racks can only be utilized between 75-80% of total capacity. As a warehouse approaches 100%, excessive time is spent in looking for suitable storage locations for inbound merchandise. When any operator is foolish enough to exceed 100%, product is then stored in aisles and staging locations with a disastrous effect on productivity.



### ***Wall Street Real Estate***

Leonard Sahling of Merrill Lynch has written a September 1999 report titled "Industrial Real Estate — From A to Z." It includes these important conclusions: the warehouse property market is more stable than the office market, less given to cyclical changes. Research performed by a subsidiary of C. B. Richard Ellis shows significant changes in vacancy rates for office properties, as compared to a relatively stable performance for warehouses.

Sahling further concludes that the reason for this is that the warehouse market is able to adapt more quickly to changing conditions. It takes less time to build a warehouse than an office building, so developers have time to respond more quickly to changes in demand. Build to suit projects account for a greater share of warehouses than of-

fices. Because offices are more speculative, they are more likely to suffer when the market softens.



### ***Stock Analysts Examine Third-Party Logistics***

In a report published in August of 1999, U.S. Bank Corp. Piper Jaffray surveys the third-party logistics industry. They indicate that the industry will experience an annual growth of about 20%, driven largely by the continued outsourcing of supply chain logistics functions. They claim that the industry grew from \$6 billion in 1991 to \$40 billion today. Market capitalization of third-party companies grew from \$600 million in 1991 to \$6 billion today.

They estimate that only about 6% of existing logistics operations are managed by third-parties, but that the industry will capture 10 to 15% of the available market in the near future. They also predict continued consolidation, particularly global mergers to build breadth and depth of service offerings.

#### **Warehousing Source Locator**

##### **Now on our web page**

Each year since this publication began, we have created a document to serve as an index to topics covered in earlier issues. Naturally the list has gotten larger as the publication continues. Because of these space limitations and the wonders of the Internet, we decided to put this document on our web page rather than distribute hard copies. We plan to update it more frequently than in the past. You can access the document at:

[www.warehousingforum.com](http://www.warehousingforum.com)

However, if you would prefer to have a hard copy, we'll be glad to mail it to you.

## Keeping score

By J. S. Keebler & K. Manrodt from the Univ. of Tennessee and D. Durtsche & D. M. Ledyard from CSC Consulting, ©`99 by Council of Logistics Management, 300 pages. Hardcover.

The subtitle of this book is: Measuring the business value of logistics in the supply chain. While there is little description of warehousing as a separate function, the ideas in this text can be applied to warehousing. The executive summary describes two questions which summarize the entire book:

- How are we performing for customers?
- How are our suppliers performing for us?

As subsets to these broader questions, five more questions are added:

- Do you know if logistics operations are enhancing or eroding shareholder value?
- Do you have capital tied up in slow-moving inventory?
- Do you know if you are providing enough — or too much— service to customers?
- When the customer says your services are not meeting its standards, do you have the information to respond?
- Are you sure that logistics is aligned with the company's goals?

The text identifies six market elements: competition, customers, technology, regulations, shareholder demands, and suppliers.

The most valuable text describes a "process view" of logistics. The three major processes are sourcing and procurement, fulfillment, and planning and scheduling. Warehousing is a logistics activity which is found in all three processes.

Warehouse managers will be particularly interested in a section describing how automated data collection improves warehouse performance. The section closes with this valuable lesson: "technology alone does not improve a business activity. The way work is designed, what is measured, and the other key elements are also critical to business improvement."



## What Logistics Managers Need To Know About Information Systems

By A. F. Ayers, *Transportation & Distribution*, September 1999, pg. 33.

If only to enlarge our vocabulary, this article about computer software is very valuable reading. It attempts the very difficult task of explaining the string of acronyms that describe current software offerings, as well as the role of legacy systems, the older software which is sometimes "bolted on" to the newer system. Our only complaint is that the subject was too broad to cover in 2 1/2 pages. However, this subject may be best swallowed in small doses.

## Logistics Rules Of Thumb

By Dick Morreale and Don Prichard, 150 pages, available from the authors with a minimum mail order of three copies via fax to: (714) 777-9027 or email to DickM50@pacbell.net

This fourth edition of a work that the authors describe as "the premier desktop reference" lives up to its billing. We reviewed the earlier editions, and each seems to improve upon the last. The entries, from over 1000 sources, and chapters cover the subjects of transportation, warehousing, third-party logistics, equipment, inventory management and customer service. A chapter on definitions is excellent but its eleven pages are not long enough. The book contains a substantial amount of practical and quantitative information. It should be in the library of every logistics professional.



## 21st Century Logistics

By D. Bowersox, D. Closs and T. Stank, ©1999 by Council of Logistics Management, 280 pp., hardcover, available at \$70 for non-members of CLM.

The sub-title of this book is "Making Supply Chain Integration A Reality." It is a continuation of a 1995 work titled "World Class Logistics: The Challenge of Managing Continuous Change." This is not a book about the characteristics of logistics. It focuses on why the work of logistics is fundamental to supply chain success. The three authors are all professors at Michigan State University. In addition to the book, a CD-ROM is included to detail the results of the management research that inspired the text.

To facilitate interest and ease of reading, the book opens each chapter with a dialogue about Charlie Change and his mythical company, Spartan Enterprises. This text is designed to help the reader understand how logistical performance can most often be improved. The research arrives at these conclusions:

- Managers of firms scoring high on supply chain competency also reported significantly better financial performance relative to competitors. Apparently superior logistical performance makes a difference in terms of financial achievement.
- Future competitiveness will hinge on responsiveness, flexibility, speed and dependability, as well as continued sensitivity to cost.
- Major differentiators in 1995 are no longer sufficient to drive competitive advantage today. Technological attributes that were key differentiators five years ago are viewed today as prerequisites for competitive success.

This book is an important contribution to the knowledge of logistics strategy.