



## BENEFITS FROM WAREHOUSE AUTOMATION: A COMPARATIVE REPORT

### INTRODUCTION

As businesses grow their warehouses and inventory expands but often the systems in place do not keep up. Inefficiencies from these antiquated systems often go undetected and therefore contain several hidden costs. Warehouse operations need to keep pace with systems and technology that can reduce waste and maximize efficiency. A Warehouse Management System (WMS) and handheld computers with wireless communications are the tools of a modern warehouse. These devices and the use of bar codes greatly improve the efficiency of a warehouse and eliminate waste.

Each item ordered, each stock location, and each order processed has a bar code that makes it easy to track and execute. Antiquated systems like spreadsheets or clipboards with lists are replaced by centralized systems and handheld computers in the hands of people who work the warehouse. Most seasoned warehouse managers are familiar with these modern warehouse systems. But for every business executive the question is: Do these systems really save you money and if so how much? This report aims to answer that question.

Datalogic ADC contracted Venture Data Corporation (VDC) to complete an extensive research project to survey warehouse executives worldwide. The goal of this project was to quantify the benefits of deploying wireless data acquisition systems and bar coding in warehouse environments.

Below is the information regarding a warehouse, the name of the warehouse is fictitious. Analysis was done using these numbers and the results show what expected savings can be obtained after implementing a wireless inventory system. This information is based on real data and real survey information provided by warehouse professionals worldwide. Use these results to evaluate the return on investment and payback time associated with deploying a Warehouse Management System (WMS) at your facility. If you would like to have this analysis performed on your warehouse data, contact your local Datalogic ADC representative.

Datalogic ADC does not sell warehouse management systems. Datalogic ADC is a worldwide manufacturer of rugged handheld computers for use in warehouse applications and warehouse management systems. Our rugged mobile computers are a key component of an automated warehouse.

## WAREHOUSE DATA

The Bureau of Labor Statistics (BLS) is the principal fact-finding agency for the United States Federal Government in the broad field of labor economics and statistics. The BLS categorizes warehouse workers as: employees who manually move freight, stock, or other materials or perform other unskilled general labor in the warehouse. This worker category has 2,135,790 workers nationwide. According to the BLS, the mean hourly wage for warehouse workers is \$12.16 and the mean annual salary is \$25,290. This information is presented on the BLS website: [www.bls.gov](http://www.bls.gov), use it to compare with wage information at your warehouse. Your wages may be higher or lower based upon various factors relative to your warehouse and its location. We will use the BLS information as a basis of comparison in the calculations.

## AUTOMATED WAREHOUSE MANAGEMENT

Taking a warehouse from a storage place to a business center means making it efficient. The goal is to know what is in the warehouse at any time from the perspective of raw materials to finished goods. With this information, production can keep pace with demand and orders can be filled with confidence. To make this happen companies rely on a Warehouse Management System (WMS).

A WMS tracks the contents of a warehouse by having bar codes on locations, items, order sheets and more. Then, mobile computers, PCs, and a central database manage the process of goods. Movement of items is detected using the mobile computers, recording the information at the central database. WMS systems come in sizes to fit any business – from an out of the box system for small to medium businesses, to a custom deployed system developed by a staff of programmers and IT professionals.

There are also cloud-based systems that use the internet eliminating the need to purchase additional servers and software. Regardless of the size, the most basic ideas behind a WMS system are simple:

- Know what is in your warehouse at any time so you can build products and fulfill orders.
- Keep inventory matched to your demand.
- Eliminate mistakes in ordering raw materials or supplies that are not needed.
- Provide outstanding customer service by knowing what products you can deliver and when.

WMS systems do much more than the items listed above, yet these are the main concepts associated with a WMS.

It is not difficult to see how a warehouse can generate waste. If raw materials are ordered and placed in the wrong location a domino affect of waste takes place. First, those materials are lost so their value is lost. Next, when those lost components are needed, time is wasted by the person looking for them and the production team needing those parts must wait to complete their build. Purchasing personnel must then place a new order for the necessary parts that were unable to be found, incurring

## ENTERPRISE INFORMATION

The following information is used as sample data regarding a small warehouse. These numbers will give you a pre-installation and post-installation sense of the benefit of wireless mobile computers in a warehouse.

Warehouse Workers	3	Workers perform picking, packing, order receipt and put away.
Hourly Wage	\$13.25	Hourly wage for your warehouse worker.
Supply Deliveries per week	12	Vendors delivering goods for use at your enterprise.
Delivery Process Time	20	Minutes needed to process each delivery - receive and put away.
Inventory Value	\$1,000,000	-
Annual Order Value	\$5,000,000	Annual revenue value shipped from your warehouse.
Order Process Time	20	Minutes required to pick, pack, and process an order for shipment.
Average Order Value	\$ 500	Average individual dollar value all orders shipped.

extra costs in parts, shipping, time, etc. One simple error can cascade into a costly waste of time and money.

Bar codes are a key component of an automated warehouse. These codes are easy to create and can be placed on every aisle, shelf, and box in a warehouse. The key companion tool of an automated warehouse is the handheld computer. These devices are rugged mobile computers that are built to survive in a warehouse environment. Their integrated wireless communications and bar code readers provide real time accuracy for a warehouse. Each time a component is picked from or placed into inventory the computer reads the bar code of the item and the location then transmits the information to the WMS system. This keeps the warehouse inventory database instantly updated in real time.

Datalogic handheld computers are used by retailers and manufacturers like Honda, Ford, Columbia Sportswear, Hollywood Video, Sherwin Williams, Chevron, and many others. If you are looking to implement a WMS system for your warehouse – regardless of the size or industry – we have a mobile computer that will make your warehouse more efficient.

### **WAREHOUSE AUTOMATION ANALYSIS**

The following analysis is based upon the information described above for the fictitious warehouse and the results of the VDC warehouse management survey.

### **ANNUAL INVENTORY PROCESS COST**

According to the parameters above, the warehouse spends \$46,817 in inventory process expenses annually. This expense includes processing the receipt of deliveries from vendors, putting these items on the shelf, picking items to fill an order, processing the order and packing the order. An automated warehouse with wireless handheld computers would reduce this expense to \$35,066. Warehouse professionals worldwide reported a reduction in the time used to process inventory of 25.10%. This is a recurring savings that is based upon increased efficiency of workers reducing the time they spend performing these tasks.

### **INVENTORY ACCURACY**

According to the parameters above, the warehouse has an inventory error value of \$195,000 annually. This error value is comprised of: components that are supposed to be in inventory but are not actually there; items that are thought to be out of stock but are actually on the shelf; items that are in stock but not tracked by the inventory. An automated warehouse with wireless handheld computers would reduce warehouse inventory error value to \$120,000. Warehouse professionals worldwide reported on average an increase of inventory accuracy of 7.50%. This is a one time savings that is based upon the reduction of existing inventory error by increasing the accuracy of the inventory in the warehouse. It is important to note that the reduction of inventory error is a hard dollar value that can often be very significant and in many cases justify the cost of a WMS system with handheld computers having wireless communications.

### **ANNUAL ORDER ERROR VALUE**

According to the parameters above, the warehouse has an annual order error value of \$775,000. The order error value indicates the value of all orders shipped annually with some error in them. This order error value does not illustrate the expense of the erroneous order but provides a magnitude of the problem. This information is important because it can indicate the level of customer satisfaction or dissatisfaction being delivered. Orders with the wrong items, missing items, missing or inaccurate quantities, etc. impact a customer's perception of a company. Warehouse professionals worldwide reported on average an increase of order accuracy of 5.10%. The study showed that worldwide on average warehouses with automated management systems had on average order accuracy of 90.6%.

### **DELAYED REVENUE – VALUE SHIPPED LATE**

According to these parameters, the warehouse has an annual delayed revenue value of \$720,000. This value indicates how much revenue is being delayed as a function of on-time shipments. Warehouse managers worldwide reported that on-time shipments prior to the installation of WMS with handheld computers having wireless communications was 85.6% on average worldwide. This value indicates that a significant number of orders do not get shipped on-time. According to the survey installation of WMS with bar coding greatly increased the accuracy and timeliness of order shipment. Surveyed warehouse managers reported on-time shipments rose to 92.10% after the installation of an automated warehouse system.



## CAPACITY INCREASE

According to these parameters, the warehouse has an annual capacity increase value of \$1,295,000. This value illustrates how many more orders the warehouse can output if no other parameters are changed. Meaning, if the number of employees and their work hours are not increased, the warehouse can process materials and ship orders beyond the current revenue level by a value of \$1,295,000. Needless to say the capacity of the warehouse may be significantly greater than this with tighter management, additional hours, or increased resources. The capacity increase value is an indication of the increased efficiency that an automated WMS brings to a warehouse.

## INTERPRETING THE DATA

The data gathered by VDC from warehouse executives worldwide clearly indicates a significant benefit can be attained from the use of wireless handheld computers in the warehouse. The fictitious warehouse values used in this analysis are independent of the survey results. In this case a warehouse with \$1,000,000 in inventory and \$5,000,000 in annual sales turns its inventory approximately five times annually. This illustrates a small to medium sized operation. It shows there are significant benefits to warehouse automation.

## MARKETS AND APPLICATIONS

Datalogic focuses solely on the development of Automatic Data Capture components and solutions used in the following applications:

- Industry leading retailers worldwide rely on Datalogic for mobility solutions in the warehouse, customer service, and scanning solutions for POS

- Datalogic is the worldwide leader in personal shopper technology
- Automobile and other major manufacturers worldwide rely on Datalogic mobility solutions for process control and inventory management
- Airports in Chicago, London, Paris, Tokyo and more rely on Datalogic sensor technology for luggage processing
- Postal systems in USA, Canada, China and more rely on Datalogic technology for parcel processing
- Transport & Logistics companies worldwide utilize Datalogic scanners and mobile computers to track shipments.

## RESEARCH PROJECT BACKGROUND

The following information is provided regarding the execution of the research by VDC on which the ROI calculator is based and the values in this report. This content was provided by VDC.

## RESEARCH OBJECTIVES

Datalogic ADC was looking to better quantify the impact of investments in mobile and wireless solutions on mobile worker operational performance in a variety of environments. More specifically, the research was looking to develop statistically viable evidence regarding the productivity and performance improvement of warehouse operations as a result of mobile and wireless investments. Specific metrics Datalogic was looking to measure – in terms of pre-investment and post-investment performance – included:

- Increase in orders processed per week
- Reduction in employee time for inventory processing
- Inventory accuracy
- Order completeness
- Order accuracy
- On-time shipments

## METHODOLOGY

To support Datalogic ADC's research objectives, VDC included a series of custom designed questions in its annual Enterprise Mobility End User Survey that VDC fielded during June and July, 2010. VDC fielded a web-based survey targeting enterprise mobility decision makers (purchasing, specifying, evaluating) across a variety of industries and global markets. VDC received 686 total responses to the survey.

Survey respondents by regional market were: Americas, EMEA, Asia-Pacific

Survey respondents by industry were: Manufacturing, Healthcare, Retail Services, Transportation, Government, Professional Services, and Other.

Survey respondents by company size (total employees) were between 100 employees and 10,000 employees.

The Datalogic ADC specific questions were only asked of respondents who had responsibilities for Warehouse/ Distribution Center operations. Based on the sample size and the regional, industry and company size representation, the results are statistically valid.



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