Warehouse Management System

Cost Justification

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WMS Cost Justification

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Warehouse Management System Cost Justification

Introduction

The benefits of warehouse management software technology are widely documented, and hundreds of articles have been published confirming the benefits of this software technology. As a rule of thumb, the successful implementation of WMS technology can reduce warehouse operations expenses by 10 – 35%. Assuming that warehouse operations expenses represent 2.0 – 3.0% of sales, then a successful WMS implementation can add between 0.2 to 1.0 percentage points to the bottom line. This document is of interest to you if you are currently in the position of trying to cost justify the investment into WMS technology for your executive management team.

A WMS cost justification is only complete if both the quantitative and qualitative benefits are documented. It is very common that the return on investment for a WMS project is comparable to other internal projects competing for capital investment, and the qualitative benefits are often the necessary ingredient to win over management approval for funds.

Ideally, the cost justification of WMS is performed with an independent consultant or a trained warehousing professional who has an in-depth understanding of warehouse operations.

This document provides an overview of the main benefits provided by a successfully installed WMS software solution, including, but not limited to:

- Labor savings.
- Increased facility throughput to enable sales growth.
- Inventory reduction.
- Customer service improvements.
- Faster order turnaround time.
- Improved order fulfillment rates.
- Reduced returns.
- Quality real-time inventory information.
- Compliance labeling.

Quantitative Cost Justification

Labor Cost Savings

Warehouse labor cost reduction is typically the major contributor to the cost justification of a WMS investment. In many instances, a WMS enables sales growth without the equivalent increase in warehouse people and equipment. In other cases, WMS reduces the need to add temporary labor during peak shipping periods. Most commonly, WMS enables a reduction or elimination in the need for overtime labor because a day's work can be done during that day's normal working hours. If a reduction of existing warehouse personnel is identified as a cost justification contribution component, remember to include a one-time capital expenditure for severance packages as required.

To identify potential warehouse labor savings, it is important to complete the following three action items:

1. Identify current warehouse productivity levels.
2. Identify potential WMS labor efficiency gains / losses.
3. Express net gains as either one-time gains or as recurring gains.

It is normal that only after a 6 to 12 month period following the implementation of a WMS software project, will the distribution operation first begin to realize the benefits of the new system. This is because during the initial time period after start-up, minimal productivity gains and sometimes productivity losses are experienced. The time required for transition to a WMS-run environment should be factored into the ROI cost justification, as savings are not immediate. For example, in the sample calculations provided within this White Paper, labor productivity gains for the first year are based on a 50% realization rate.

Identify Current Warehouse Labor Productivity Rates

It is well documented that significant gains in warehouse productivity and efficiency will be realized if, and only if, ongoing productivity measurement is in place. If you currently do not monitor your warehouse operation by systematically reporting on productivity, then this is a critical first step to put into place. The importance of understanding productivity rates by each functional activity is demonstrated within the cost justification example provided in this report. Without a basic understanding of current operating practices, it is unlikely that you will be in a position to identify realistic and achievable labor productivity targets with a new WMS.

During the process of investigating the warehouse operation, be sure to identify the *real* issues which deter optimal operations, many of which are completely unrelated to computer support. Examples of questions to ask may include:

- Are the fastest moving products assigned to appropriate storage locations that are strategically located within the warehouse in order to minimize travel time? Or are products picked from wherever we can find a place for them?
- Is the warehouse location addressing system easy to understand and easy for a new operator to learn quickly? Is it easy to add new locations without having to renumber the whole aisle? Are letters used extensively rather than numbers within the location address?
- Are products being picked from the most appropriate size of storage location in relation to their order line activity and their cubic volume of movement? How often is there a review process to identify products to be relocated because their velocity profiles have changed?
- Does it make sense to have a dedicated section in the warehouse for "very slow" products? Are the "dog" items currently mixed in with all other items?
- Does it make sense to slot the warehouse in item warehouse family groupings based on product characteristics or based on order profiles?
- Are pick errors generated because multiple units of measure are being picked from within the same location?
- Is there a cycle counting program in place to continually groom inventory accuracy? Or does inventory information begin to deteriorate shortly after the annual physical count is completed?
- Are products quickly and easily identified at the receiving dock? Do certain suppliers continually ship products that were not placed on the purchase order? Do certain suppliers continually switch packaging formats without informing you first? Do certain suppliers consistently ship the wrong items and/or quantities?
- Do operators move inventory and put away products in the warehouse based on memory-based processes? Does it take a long time to train a new operator for a stock-mover position?

These questions and many others require investigation in order to best identify the best operating environment for your distribution center.

To identify current labor productivity rates, it is important to document current labor force breakdown for a *typical* four-week period, by major warehouse functional activity as demonstrated by the following example:

Direct Labor Functional Activities	Total Hours for Sample Period	Total Wages with Fringe	Total Transac-tions*	Cost per Transac-tion
• Receiving				
• Inspection / QC				
• Putaway				
• Repackaging				
• Order Picking				
• Replenishment				
• Packing				
• Checking				
• Staging				
• Shipping / Loading				
• Value Added Services				
• Assembly / Production				
• Other				
• Total Direct Hours				
Indirect Labor Functional Activities	**Total Hours for Sample Period**	**Total Order Lines**	**Average Hours per Week**	**Average Order Lines per Hour**
• Clerical				
• Inventory Control				
• Management				
• Housekeeping				
• Other				
• Total Indirect Hours				

* **Total Transactions** = A meaningful metric to establish for each type of transaction whereby the metric can differ for each transaction (e.g., putaway could be measured on pallets put away; order picking could be measured on order lines picked, etc.). The metrics established depend upon the characteristics of your operation.

It is key to identify a common denominator or metric that is used to express productivity rates such as order lines, cubic feet, pounds, cases, pallets, etc. The ultimate goal is to have a benchmark statistic to measure total warehouse productivity as a function of volume. For example, we ship an average of 15 order lines per hour, or we pick at an average rate of 100 order lines per hour.

Identify Potential WMS Labor Efficiency Gains

This step will be the most challenging exercise to complete as it requires an in-depth understanding of realistic and achievable productivity levels within an unfamiliar environment. Most warehouse managers will have had limited experience in the implementation of WMS technology. As such, companies often employ outside consultants to identify new operational procedures and productivity targets. A common error is to overstate productivity gains in an attempt to cost justify a WMS project. When these gains are not realized, it reflects poorly on the manager responsible for managing the budget.

Opportunities for labor efficiency improvements are discussed below by major functional activity.

Receiving / Putaway

A study of your current receiving operations is best done by reviewing common problems experienced at the dock. Interviews should be conducted with a receiving supervisor and an experienced receiving operator. They will be able to identify all receiving exceptions which cause dock congestion and lost time. There are many causes for receiving exceptions and WMS will not eliminate all of them. However, WMS will alleviate all of the strains related to manual paper based systems which slow down the receiving and putaway processes.

On-line real-time receiving combined with bar code labeling of inbound product will reduce dock congestion and substantially improve inventory accuracy. Furthermore, system-directed putaway will greatly improve the time required to clear off the dock. In turn, a reduction in dock congestion improves overall flow of goods and ability to receive and ship more volume through the facility.

Receiving and Putaway can be inefficient for the following reasons:

- Inbound loads arrive, and there is no information available to identify the inbound order(s) and order details. The warehouse manager searches for the buyer who cannot be found or works on a different shift.
- Inbound order line item discrepancies in the form of overages, underages and damages. These exceptions need to be entered into a front office computer and resolved with approvals from buyers and/or inventory managers.

- Product-specific information including expiration date, lot number and serial number must be captured at the time of receiving. This data in turn needs to be keypunched into a computer.
- Delays in entering receipts into the host computer system cause inventory to sit at the receiving dock congesting the operation and resulting in lost productivity. Lost sales opportunities occur because the inventory is not considered available until it has been stored.
- Keypunching of receiver documents and information yields erroneous data and subsequent research processes to correct the data entry mistakes.
- Mistakes in returns processing causes inaccurate credit memos to be issued, resulting in overpayment of credit and intensive clerical labor requirements in Accounts Receivable.
- Pallet-stacking instructions are not provided to the receiving operator causing slow and inconsistent unit load creation.
- Putaway operators cannot commence putaway activity until the entire receipt is closed out by the receiver causing congestion on the dock.
- Putaway operators search the aisles within the warehouse to find storage locations for the product.
- Putaway locations are written down on a paper document or cards and subsequently keypunched into the computer.
- Putaway of inventory to the wrong location causes search and retrieval work to be performed by inventory clerk(s) to resolve the missing inventory.
- Operators could perform multiple putaway tasks of many items in a single trip, but this cannot currently be done due to confusion and error.

Order Picking / Packing / Checking / Shipping

Inefficiencies in these areas are probably the most important to identify because these activities typically represent 60 - 70% of overall warehouse labor hours.

Inefficiency in order picking / packing / checking / shipping are typical for the following reasons:

- Paper pick lists need to be manually sorted prior to their release due to lack of an order planning system.
- Paper pick lists are not sorted in a logical bin sequence causing pickers to have to figure out the best route.

- Order pickers are forced to read too much information on their pick list.
- Pick locations are identified by complex addressing systems which are difficult to understand and cause new employees to make errors.
- No ability to pick multiple small orders with a single pass through (e.g., batch picking or cluster picking).
- No ability to ensure that order lines are optimally picked by breaking the demand quantity across multiple stock-keeping units of measure (e.g., full case pick instead of picking eaches).
- Multiple units of measure for the same item are picked from the same bin location.
- Multiple SKUs are picked from the same location.
- Operators pick products that have been received, but not yet entered into the inventory system causing confusion later on.
- Poor organization of the pick line results in high activity products being picked in the furthest locations away from the shipping dock
- Vertical upward travel is required to pick products that have sufficient movement velocity to warrant being picked from ground locations.
- High volume products inappropriately slotted in locations which are too small (e.g., an item moves a pallet per week and is picked from a shelf bin).
- Packing and checking are managed as distinctly separate activities when they could potentially be combined with picking.
- Inaccurate replenishments of pick locations generate many pick errors.
- Pick locations are empty, causing the picker to search for a replenishment operator or “scratch” the order line.
- Pickers use inappropriate mobile equipment, causing unnecessary loss of time getting on and off a vehicle, or having to manually pull non-motorized heavy equipment such as tuggers.
- Aisles are congested or temporarily filled with staged inbound products awaiting putaway, making it difficult for pickers to access their products.
- Dead-end aisles or aisles that are too narrow for passing comfortably.
- Pickers must manually record information on pick lists or inventory cards.
- Packers or checkers validate all picking results to confirm shipping accuracy.

- Lot / serial number data entry is a required data keypunching step as part of the shipping cycle.
- Information is unnecessarily keypunched at the time of shipping to satisfy a trading partner's EDI ASN (856) requirements.
- Containers holding multiple order lines are manually labeled and recorded at shipping to satisfy outbound EDI / ASN compliance.
- Product is re-handled or restacked in the process of load preparation.
- Completed orders are unnecessarily transferred across the shipping dock due to weak outbound shipping planning.
- Shipments are loaded on to the wrong trailer.
- Orders are delayed or shipped incomplete because segments of the orders were not completed and were hung up.

Many of the above examples will not be applicable to your particular operation. The challenge is to ask the right questions that result in new ways of doing things because work is eliminated.

Replenishment / Letdown

Inefficiency in replenishment is only applicable in the operating environment where products are assigned to fixed pick locations. In the random picking environment, replenishment is eliminated. Random pick slots do not necessarily provide a more productive operating environment because of the fact that the replenishment function is eliminated. There are definite tradeoffs to be considered when implementing the random locator system, and this strategy definitely does not lend itself well to many distribution environments.

For those companies performing the replenishment activity in the warehouse, the following inefficiencies are common:

- The replenishment operator must travel long distances throughout the facility to retrieve reserve inventory.
- Reserve inventory is not where it was supposed to be causing the search and retrieval of product.
- There is no ability to track reserve inventory, causing poor inventory rotation control and unnecessary search and retrieval time for product.
- Too many replenishments are performed because there is no system to dynamically trigger replenishments with optimal product quantities.
- Pick slots are inappropriately undersized for the faster velocity items, causing too many replenishments to be done.

- Pallet letdowns are performed too early, causing excessive re-handling of residual product in the pick slot.
- Manual operator-directed replenishment procedures which result in operators roaming the aisles looking for depleted pick slots.
- Commingling of multiple SKUs or pallet loads in the same location, causing multiple product handling tasks to retrieve a unit load of reserve inventory.
- Poor control of expiration date and poor inventory rotation causes reserve inventory to expire slowing down the replenishment activity.
- Poor control over the timing of replenishments causing pick slots to be depleted during order picking such that the picker searches for the replenishment operator to perform "hot" letdowns.
- "Pick scratches" cause replenishment operators to perform product retrievals to be brought forward to the shipping dock.

Inventory Control and Cycle Counting

Most distribution companies perform physical inventory counts at least once per year to ensure inventory accuracy. The implementation of WMS in conjunction with bar coding and radio frequency technologies provides such accurate inventory levels that most major accounting firms now accept inventory asset information without the need to perform a physical count.

For many companies currently performing cycle counts as a means to ensure inventory accuracy, it is typical that system support in this area is weak. Many systems do not offer the flexibility needed by the distribution company to truly manage the cycle counting function.

Inefficiency in inventory control is typical for any of the following reasons:

- The physical inventory count causes the operation to shut down once per year or per fiscal quarter resulting in expensive time loss.
- The physical count results in costly overtime expense.
- It is uncertain if the physical count actually improves the quality of inventory information, or if inventory inaccuracy is negatively impacted by the count.
- Cycle counting operations are manually controlled and it is difficult to ensure that all cycle counts are actually performed by the operators.

- System support for cycle counting is limited to logic based on ranges of products rather than ranges of locations resulting in difficulty recovering "out of book entries" (i.e., lost product residing in locations that the system thinks are empty).
- Cycle counting is not performed, causing inaccurate inventory which negatively impacts all aspects of labor performance as well as customer service levels.
- Poor inventory control results in lot product that goes beyond its expiration date.
- Poor inventory control results in higher safety stock levels and demand for storage capacity. The fuller the warehouse, the slower the operation becomes.

Express Net Gains as Either One-Time Gains and as Recurring Gains

Within this white paper, the sample cost justification spreadsheet provides a template to assist in the development of a payback analysis. The net present value of the project represents the total cost savings over a projected timeline (in our example, this is a five-year horizon) expressed in current dollars). The net present value of the project allows financial accountants to compare all projects on a level playing field as it takes into consideration the time value of money. For example, a dollar savings three years into the future is not equivalent to a dollar savings today because inflation must be factored into the equation.

As indicated earlier, it is important to not overstate the first year's cost savings because of the initial learning curve. In our example, we state first year savings at 50% of expected annual savings.

Inventory Savings

It is well documented that WMS technology is a key enabler to achieving near perfect inventory accuracy in the warehouse. The benefit of inventory accuracy is most often associated with improvements in customer service levels and order fill rates. However, inventory accuracy can also contribute to a significant reduction in inventory levels within the distribution center. After all, one of the components of safety stock is the unstated covering off for inventory inaccuracy. In short, consistent inventory accuracy directly translates into lower safety stock levels.

A common mistake that distribution managers often make is the measuring system used to state inventory accuracy levels. Many executives overstate their inventory accuracy because their measurement is based on dollar inventory counted at the last physical compared against the system's perpetual dollar inventory. An extreme example of how faulty this measurement is lies in the fact that using this measurement, 100% of items stored in the warehouse could have wrong inventory information even though inventory is measured as being 100% accurate!

It is important to measure inventory accuracy based on one important principle: How often does an operator go to a location, and therefore is the quantity of items in the location accurate? How often are cycle count adjustments done as a percentage of all cycle counts? And more subjectively, how confident is an order entry operator in the inventory statistics that they see on their work station? In some operations, both inside and outside sales representatives go into the warehouse to check stock to be certain that they can fill an order — this represents inefficiency!

To identify potential inventory reduction levels, it is important to perform the following steps:

- Identify current inventory turns expressed as average days on hand.
- Identify the percentage inventory accuracy currently in place (physical inventory counts are the best indicator of this, e.g., 96.4% of the cycle counts conducted do not result in any changes to inventory).
- Assuming 99.9% inventory accuracy if the operation is changed over to a bar-coded inventory environment, calculate the percentage improvement in inventory accuracy (e.g., 99.9% – 96.4% = 3.5%).
- Multiply the percentage inventory improvement by current days on hand to estimate the amount of inventory which will be reduced from current carrying levels.
- Calculate the inventory reduction savings by applying the company's accepted inventory carrying cost against the anticipated dollar amount of inventory to be eliminated.

Outbound Transportation Savings

Improved order planning and scheduling enable orders to be released in waves such that outbound transportation shipments can be optimized in advance of order picking. Depending on the distribution environment, outbound transportation savings may range from a negligible to a significant amount of money. For many distribution companies, the use of a third party software system dedicated to transportation optimization can further help to improve the shipping and dispatch functions.

It is beyond the mandate of this document to discuss the multitude of ways in which transportation savings may be realized since WMS does not focus on transportation issues. The key cost savings with which WMS provides the distributor is based on the ability to consolidate outbound orders prior to shipment in a planned and scheduled approach. WMS also ensures that shipments are not released until all the orders and order segments for the shipment have been picked, packed and loaded onto the right outbound trailers

WMS-related transportation savings opportunities are typically generated for the following reasons:

- Outbound transportation documents such as shipping labels, bills of lading, shipment manifests, and driver tripsheets are manually generated by hand instead of being automatically generated by a computer.
- Outbound transportation paperwork is manually marked up to reflect picking / shipping exceptions.
- Outbound orders are released for picking throughout the day, and there is no process to consolidate multiple orders going to the same ship-to address into the same shipment.
- Orders are shipped by small package carrier when they could have been shipped as a consolidated LTL shipment for a lower cost.
- Hazardous materials cannot be shipped by air carriers, and manual procedures are in place to ensure that this does not occur.
- Private fleet truckloads need to have the load's orders staged in reverse stop sequence, with all the work manually controlled by a dispatch manager rather than exceptions only.

Paperwork Reduction

WMS technology introduces the potential for paperless warehousing. All transactions are recorded to detailed electronic audit trails with operator and date/ time stamps on every single activity. Quick online access to this information eliminates huge stacks of paperwork.

To identify the savings in paperwork, it is important to gather all paper forms currently used within the warehouse including:

- Receiver documents
- Inventory cards
- Putaway / replenishment / inventory move records
- Cycle count and physical inventory count books
- Inventory adjustment forms / reports
- Pick forms
- Miscellaneous paperwork
- Manually-generated reports

Certain documents such as packing slips and transportation documents will continue to be in use after WMS is implemented, and should therefore not be included in the paperwork elimination savings.

The cost of bar code labels and printer ribbons is a new recurring expense which WMS may introduce, and it is a cost that is often underestimated. As such, overall analysis should include labels/ ribbons expense and paperwork savings.

The cost of the paperwork is small in comparison to the cost of the manual data keypunching required in the paper-based warehousing environment. The cost of manual clerical functions also needs to be identified.

Picking / Shipping Accuracy

The ability to ship customer orders with 100% accuracy is one of the main qualitative benefits of WMS technology. It is difficult to express this as a quantitative dollar savings because the true value of order accuracy is that you stay in business. Sometimes people express order accuracy and order fulfillment improvements as a quantitative amount by estimating lost or gained sales revenue. It is the author's opinion that it is best to express this as a qualitative benefit rather than attempting a guess at this type of information.

There are real cost savings related to improved shipping accuracy which may be included in your analysis. For example, if order lines are returned to the distribution center because of picking or shipping errors, then this is a real cost. If these mistakes result in credit memos being issued and transportation costs being absorbed to return products, then these are real costs to be saved.

To appreciate the savings related to customer returns generated due to inaccurate picking and shipping, it is important to perform the following steps:

- Identify the number of monthly returns related to inaccurate shipments.
- Assess the true cost of a return including transportation costs, credit memos, administrative costs and paperwork costs.
- Assume three per 5,000 order lines will always be shipped inaccurately and extrapolate the savings to an annual amount.

Warehouse and Fixed / Mobile Equipment Savings

Improved labor productivity often translates into savings in mobile equipment. If fewer people are involved in the operation, then one may conclude that less mobile equipment is required as well. This may be expressed as a one-time avoidance cost savings and also as an ongoing maintenance savings. For example, by eliminating the need for a forklift operator, can you avoid the acquisition of a new forklift during the time horizon considered (e.g., the next five years)?

One-time capital expenditures are important to identify because they represent real savings if they can be eliminated or delayed. For example, if the expansion of your distribution center is delayed for three years as a result of the WMS project, then the required capital is available for reinvestment at the current rate of interest. This is a tangible savings. If labor productivity gains cause the oldest piece of mobile equipment to be retired, then maintenance costs are saved, and so on.

Outside storage costs should also be considered if inventory reductions enable less rental of outside storage space. Warehouse shuttle costs should also be saved in this scenario.

Try not to combine the cost justification of a WMS project with other warehouse projects such as the improvement of automation of your distribution facility or else you run the risk of trying to sell the executive management team on a project with too great of an investment to absorb.

Qualitative Justification

The key qualitative benefits to WMS technology are related to inventory accuracy and the elimination of manual systems and their related problems. Since these benefits are difficult to quantify, they should be expressed as commentary.

Potential qualitative benefits relating to the elimination of inaccurate inventory include:

1. Reduced lost sales due to missing products.
2. Reduced back orders.
3. Improved customer order accuracy.
4. Improved order fulfillment rates.
5. Faster order turnaround time.
6. Improved delivery scheduling and planning.
7. Less inventory obsolescence.

Other qualitative benefits include:

1. Trading partner label compliance and fine avoidance.
2. Increased cross dock activity.
3. Elimination of labor-intensive data and file maintenance.
4. Elimination of risk related to memory-based warehousing practices and reliance on key individuals.
5. Customer order lead time reductions.
6. Improved reporting and monitoring tools.
7. Improved management control.
8. Improved return on assets.

Common Pitfalls of Implementation

This final section discusses some of the common pitfalls which distribution companies make during the planning stages and during WMS implementations.

1. Misunderstanding the benefits of WMS.
2. Failure to identify the needs of your system.
3. Automating poor operating procedures (i.e., doing the bad faster).
4. Failure to consider the impact on operational and plant layout changes.
5. Under budgeting – not allowing for contingencies.
6. Functionality versus design.
7. Unrealistic scheduling – rushed implementation.
8. Over-customization of software.
9. Insufficient system acceptance testing and debugging.
10. Inflexibility in changing operation.
11. Poor training of operators.
12. Low budget for system support.

Sample WMS Cost Justification Analysis

The following table provides a sample cost justification exercise .

Category	Description	Potential Payback
Receiving Operations Data Entry	**Current Operations:** • Manual paper-based receiving. • 6,000,000 characters per year keystroke entries to enter receiving results into the computer. • 1.2 full time data entry operators. **Proposed Operations:** • On-line real-time RF Receiving with bar code license plates applied to inbound inventory. • Online bar-coded receiving can reduce this to 600,000 keystroke entries per year. • Operators manually searching for putaway locations to store inventory requires 110 hours per week.	• Assume that 1 error occurs in every 300 keystrokes which is an industry-accepted standard. • Assume that a bar-coded receiving operation produces an error rate of 1 in 3,000,000. • Assume a cost of $7.50 per error to pay for lost time to correct to inaccurate inventory. • Annual error reduction of 18,000 errors @ $7.50 saves *$135,000 per year*. • Eliminating 1 data entry operator saves *$20,000 per year*.
Receiving Operations A/R error correction	**Current Operations:** • A total of 1,000 errors per year were recorded at returns receiving causing problems for which a credit memo, RMA, customer invoice reconciliation or additional billing was required. **Proposed Operations:** • Eliminate manual keypunching of inbound receiving records through online real-time RF Receiving. • Assume 95% reduction in human errors involving data capture.	• Assume that each returns receiving error generates $50 in cost related to lost revenue and/ or time spent on A/R discrepancy handling. • Annual billing error reduction of 950 errors @ $50 each = *$47,500 per year*.

Category	Description	Potential Payback
Putaway Operations	**Current Operations:** • 3 dedicated putaway operators • Operators require 120 hours/week to perform putaway. • Operators perform 1,500 putaways per week. • Forklift operator salary is $21,000 + 20% fringe benefit. • Operators manually search for and record putaway locations on cards which are subsequently keypunched. • Approximately 800,000 keystroke entries/year. **Proposed Operations:** • Online real time RF Putaway with bar code license plates applied to storage locations for validation. • System-directed Putaway. • Replenishment and putaway RF task interleaving.	• System-directed putaway will reduce forklift travel time by 50% • RF Task interleaving to provide 10% productivity gain. • Estimated savings in putaway labor of 40 hours/week = *$25,000 per year*. • Data entry elimination of 800,000 keystrokes/year eliminates 2,667 inventory location errors @ $7.50 per error = *$20,000 per year* savings.
Order Picking / Packing / Checking Operations	**Current Operations:** • 20 full-time dedicated order pickers and packers in a typical week. • Packing performed as a separate function and requires 100% of product to be re-handled. • Operators require 750 hours/week to perform picking and packing. • Operators pick and pack on average 30,000 order lines per week: net rate 40 lines/hour. • Operator salary is $20,000 + 20% fringe benefit. • All pick exceptions are keypunched into the system at shipment completion. • 2 full-time checkers validate outbound order accuracy at loading dock.	• Combined picking and packing with the use of RF terminal to yield a 20% gain in productivity to 48 lines/hour. • 3 pickers/packers eliminated saves *$72,000/year*. • Eliminate 1.5 checkers in 12 months time for total savings of *$36,000/year*. • Pick exception keypunching: Activity will be eliminated but consider savings negligible since the supervisor is still required to manage outbound operations.

Category	Description	Potential Payback
	Proposed Operations: • Online real time RF picking and packing into bar code license plated shipping cartons. • Packing of dunnage and application of shipping labels and paperwork remains separate process but re-handling is eliminated. • Significantly reduce checking function 12 months after startup.	
Replenish-ment Operations	**Current Operations:** • 2.5 dedicated replenishment operators. • Operators require 100 hours/week to perform replenishment. • Operators perform 1,200 replenishments per week. • Forklift operator salary is $21,000 + 20% fringe benefit • Operators manually search for overstock locations, execute and record replenishment tasks onto paper cards which are keypunched. • Order pickers chase down replenishment operator when a pick slot is short on stock. • Approximately 625,000 keystroke entries/year. **Proposed Operations:** • On-line real-time RF Replenishment with bar code license plates applied to storage locations for validation. • Replenishment will be system-directed in batch and dynamic mode.	• System-directed replenishment combined with task interleaving will reduce forklift travel time by 50%. • Estimated savings in replenishment labor of 40 hours/week = *$25,000 per year*. • Data entry elimination of 625,000 keystrokes/year eliminates 2,083 inventory location errors @ $7.50 per error = *$15,600 per year* savings.

Category	Description	Potential Payback
Physical Inventory Count	**Current Operations:** • Facility shutdown for a total 4 days/year (once every fiscal quarter). • 30 operators hired per count at double pay. • Average cost including fringe is $188 per operator-day. • Inventory count books are keypunched, resulting in 600,000 data keystrokes. **Proposed Operations:** • Real-time system-directed cycle counting will be interleaved throughout day-to-day operations replacing our current cycle count methods. • Eliminates need for physical inventory count.	• 120 operator days x $188 per day saves *$22,600 per year*. • 600,000 data entry keystrokes yields 3,000 errors at $7.50 per error = *$22,500 per year*.
Inventory Levels	**Current Operations:** • Average inventory level of $15,000,000. • Inventory turns 3.6 times/year for an average days on hand of 101 days. • Annual physical count reveals current inventory accuracy at 96.4%. • Inventory carrying cost is 24%. **Proposed Operations:** Anticipate 99.9% inventory accuracy supported by RF and bar code tracking of inventory.	• 3.5% anticipated increase in inventory accuracy. • 3.5% x 101 days on hand = 3.5 days of stock currently lost and therefore may be eliminated. • Total reduction in inventory of $520,000 @ 20% carrying cost provides savings of *$104,000 per year*.
Paper Reduction	**Current Operations:** • A total of 212,000 paper documents are annually transferred from the warehouse to the office for subsequent data entry; many of these documents are produced in duplicate or photocopied.	• 212,000 forms eliminated /year @ $0.15 per form yields savings of *$31,800 per year*.

Category	Description	Potential Payback
	• Paper documents include pick/pack slips, receiver documents, cycle count books, and inventory movement cards. • Assume $0.15 per paper form. **Proposed Operations:** • RF paperless operations to eliminate all paper forms.	
Picking / Shipping Accuracy	**Current Operations:** • A total of 650 RMA's were generated during the fiscal year due to picking, packing and/or loading errors. • Each RMA was returned generating additional transportation costs, handling costs, paperwork and re-shipment costs. • Assume $75 cost per RMA. **Proposed Operations:** • The use of RF and bar code scanning throughout picking, packing and loading will reduce errors from 650 to 30 RMA's per year.	• 620 RMA's / year eliminated at $75 per RMA yields savings of *$46,500 per year*.
Mobile Equipment Usage	**Current Operations:** • A total of 6 battery powered forklifts are in use to primarily handle putaway and replenishment. • We are budgeting $35,000 for the purchase of a new forklift in the next 3 years to handle increased workload. **Proposed Operations:** • Improvements in putaway and replenishment productivity will eliminate the need to acquire the new forklift.	• One time gain of *$35,000* avoidance cost savings. • *$2,000 per year* related equipment maintenance savings.

Category	Description	Potential Payback
Warehouse Space Capacity Utilization	**Current Operations:** • Outside storage capacity is required to store pallets for 3 months of the year during peak operations. • Rental of space is approximately $75,000 per year. • Transportation shuttle costs are $150 per load. **Proposed Operations:** • System-directed WMS, controlled SKU commingling of reserve inventory and reduced inventory levels will eliminate the need for outside storage.	• Rental and shuttle savings of *$80,000 per year*.
Outbound Transpor-tation	**Current Operations:** • Average of 750 weekly shipments • Average transportation cost per shipment is $77. • No support tools to ensure shipment consolidation for orders destined to same state. • Lost LTL opportunities. **Proposed Operations:** • New order planning module to ensure LTL shipments are sent out for shipments > 150 lbs. • Eliminate a minimum of 50 weekly shipments through consolidation. • Estimate savings at 30% of shipment cost or $23 per shipment.	• Savings of 50 shipments @ $23 x 52 = *$60,000 per year*.

Warehouse Management System Justification - Summary of Cost Savings

ITEM	DESCRIPTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
		(000s)	(000s)	(000s)	(000s)	(000s)
Receiving	Data entry function eliminated	10	20	20	20	20
	Date entry error reduction	67.5	135	135	135	135
	Billing and A/P error reduction	24	47.5	47.5	47.5	47.5
Putaway	Putaway labor savings	12.5	25	25	25	25
	Data entry error reduction	10	20	20	20	20
Picking / Packing	Picking & Packing labor savings	36	72	72	72	72
Checking	Checking labor savings	12	48	48	48	48
Replenishment	Replenishment labor savings	12.5	25	25	25	25
	Data entry error reduction	7.8	15.6	15.6	15.6	15.6
Physical inventory count	Eliminate physical count - labor savings	11.3	22.6	22.6	22.6	22.6
	Data entry error reduction	11.3	22.5	22.5	22.5	22.5
Inventory Reduction	Reduced inventory carrying cost	52	104	104	104	104
Paper Reduction	Eliminate paper forms	15.9	31.8	31.8	31.8	31.8
Picking/ shipping accuracy	Reduced RMA's / customer returns	23.3	46.5	46.5	46.5	46.5
Mobile Equipment Usage	Offset acquisition of forklift	0	37	2	2	2
Warehouse utilization	Reduce outside storage	40	80	80	80	80
Transportation	Shipment consolidation savings	30	60	60	60	60
Total Savings		**376.1**	**812.5**	**777.5**	**777.5**	**777.5**
Cost of Capital		8.00%	8.00%	8.00%	8.00%	8.00%
Net Present Value		**$348**	**$697**	**$617**	**$571**	**$529**
Total NPV		**$2,763**				

An Overview of Kom International

Kom International provides innovative, unbiased and proven supply chain consulting services that enable companies around the world to manage logistics activities more effectively. Over the past 40 years, Kom International has worked with many of today's Fortune 500 companies across a wide spectrum of industry sectors to deliver world-class customer service levels at the least possible cost.

Kom International's profile:

- 40 years of experience consulting in warehouse, transportation, distribution and supply chain technology solutions.
- Over 1,000 clients served.
- 3,600 projects successfully completed.
- One of the few consulting firms that provide 100% unbiased advice.
- Markets served: North America, South America, Europe, and Asia.
- Clients range from small family businesses to Fortune 500 firms.

Kom International's core supply chain consulting competencies are in the following areas:

- Logistics strategy – optimization of distribution networks.
- How supply chain policies affect the bottom line.
- Evaluation of distribution operations to improve efficiency / service.
- Distribution center design and layout.
- Reset and optimization of existing distribution facilities.
- Implementation services.
- Supply chain technology solution selection and implementation.
- Industry productivity benchmarking.
- Inventory management to reduce cost of goods.
- Transportation and fleet management.

Kom International has a reputation for delivering logistics solutions that are practical, flexible and value-oriented. To better understand how Kom International can help your firm achieve world-class logistics, contact us at our worldwide headquarters and request a business assessment at no obligation or visit our Web site at www.komintl.com.

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