

# ***INVENTORY & WAREHOUSE SYSTEMS FOR ANIMAL NUTRITION***

## **HOW TECHNOLOGY CAN DRIVE OPERATIONAL EXCELLENCE**

**WEM Automation**

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# INTRODUCTION

In today's animal nutrition market, time is of the essence. Expectations of the modern feed mill, premix, or pet food plant have expanded over the past several decades. Consumers, auditors, and company officials want information quicker and more precise than ever before. With new regulations, guidelines and consumer expectations; a company's reputation is based on providing high quality feed or animal food that is backed by data showing due diligence was done throughout the production process.

Today's technology allows us to install more and more safeguards in place as well as collect the necessary data to show that a company has sound Standard Operating Procedures (SOP) and is following all Current Good Manufacturing Practices (CGMP). Technology is reducing the human risk element more and more in today's market, allowing for a higher quality of end product, yet still maintaining high production efficiencies.

In the animal nutrition industry, processes have been slow to develop with technology. History, for the most part, has relied greatly on self-monitoring and accountability. Companies developed SOP's according to their operations and maintained accountability through human verification. Verifications could be done via medicated license audits, organic compliance, internal company audits, or basic management verification.

Over the past decade alone animal nutrition facilities have had to deal with increased complexity primarily from the proliferation of formulations. The processes employed to deal with the complexity have been proven to be, for the most part, reliable methods. However, the processes rely heavily on human controls, which can be a wild card. Good intentions can still lead to errors in production. These errors can take place in all aspects of the process, i.e. receiving, batching, loadout, delivery, packaging, etc.

Moreover, the cost implications of inventory errors and inaccuracies associated with the increased complexity has created a financial need to control inventory transactions throughout the entire facility.

To reduce errors a total system approach is necessary. The system must provide control of all the inputs and outputs across the people, SOP's, process and tracking of performance. Technology can tie it all together.

## PROBLEM DEFINED

There is an adverse amount of human risk in all aspects of the production cycle from receiving to delivery. In nearly all cases, good intentions by the operator exist, however, due to human error, mistakes can be made.

These errors can be costly mistakes for companies. Examples of costly mistakes that are attributed to human error:

- Receiving the wrong ingredient
- Misplacing material

- Gathering and using the wrong material
- Shrink and loss
- Running out of material or over allocations
- Routing raw ingredients to the wrong bin
- Weighing up the wrong amount of a micro ingredient
- Mixing product with out-of-tolerance ingredients
- Packaging errors
- Loading incorrect end-product onto truck for delivery
- Delivery of end product to incorrect destination

The ramifications of these errors can range from minor to significant costs in several ways:

- Material variances and loss
- Lost time searching for materials
- Loss of productivity due to co-mingled ingredients
- Scrap
- Expediting expense
- Increased labor to conduct cycle counts and physical inventory
- Medicated product delivered to animal too close to market date resulting in extended withdraw time
- Need to remake product due to incorrect delivery or miss-mix
- Incorrect product can lead to numerous problems such as animal performance, weight gain, gut health or even death
- Missed shipments
- Audits and recalls

## CURRENT SITUATION

Automation control systems today have technology available to help companies meet the increased production demands without sacrificing quality. In addition, today's automation control systems now offer more accountability and traceability than was previously available in older versions of automation. What is traceability? Traceability is defined as the ability to trace history, application, or location of an entity by means of recorded identifications.

**RECEIVING:** Receiving is the first area of risk for animal nutrition manufacturers in today's environment. Today, a company must ensure that any deliveries made to their facility are from an approved supplier. This ensures the integrity of the raw ingredients for high quality end-product. Operators may rely on dispatch reports to ensure that deliveries being made are indeed intended for that facility, date, and vendor. In addition to ensuring the load is correct, operators must log critical information to begin the tracking process of raw ingredients for both bulk and bagged products. In terms of bag products, operators must record lot numbers, quantity, and expiration dates to meet audit requirements. Operators must ensure that these logs are passed to the proper location to ensure compliance in recordkeeping.

**BATCHING:** The area with the highest risk to quality is in the batching process. This is due to both the human element in this process as well as the complexity behind the many formulations. Regardless of the amount of automation, humans are still required to pre-make hand adds or add ingredients to the micro system. Facilities that use medications or organics are under tighter scrutiny to ensure that their ingredients have been properly sequenced or flushed to prevent any carry over to the next end-product.

**LOADOUT:** More consumers are demanding antibiotic free (ABF) protein as well as organic produced products. U.S. retail sales of organic food more than tripled to \$32.3 billion over the decade, according to the Organic Trade Association. Companies must balance between being all ABF, partial ABF, or partial conventional end-product. There is a high risk of loading the incorrect type end-product to be delivered to the animals. Tracking the end-product to the point of loading the truck is also typically where automation control systems stop.

**DELIVERY:** Currently every company is at the mercy of human integrity when it comes to delivering end-product to the correct location. While intentions and integrity usually run high in animal nutrition delivery personnel, there are documented cases of end-product being delivered incorrectly. This causes a multi-fold cost to the company. First the company must recall the end-product. Second, the company must remake and redeliver the end-product. Last, the company must pay for any damages incurred due to incorrect end-product being delivered. Tracking the end-product to the final delivery location is heavily based on physical paper logs that require additional administrative costs for filing, logging, and verifying.

## FUTURE SITUATION

As the global population grows to 9.7 billion as expected by 2050 from 7.3 billion today, protein producers will have to generate over 500 million tons of meat annually. Although the feed industry has already made significant improvements in productivity over the past decade, the need over the next three decades to supply the demand for protein will be incredible. Technology will have to keep pace.

**RECEIVING:** WEM Automation control systems can now seamlessly integrate with third party ERP systems for purchasing and accounting. This allows a company to utilize the strongest purchasing system to track real-time costing as well as manage complex purchase orders, without sacrificing lost information. Interfacing with these corporate ERP systems, the automation system is able to still manage the facility from a secure standpoint, yet, share the relevant data with the ERP system. Human error risk is reduced by eliminating the need for double entry of data, time delays in data entry, and incorrect recording of information. In addition, the control system is able to begin its thorough tracking of products by recording receipt of the product into its inventory database. Barcodes and RFID technology is available to electronically monitor the inventory, location, and

expiration of bagged material. This allows for quick reconciliation and reports for audits.

**BATCHING:** WEM Automation control systems utilizing barcode systems or RFID tagging systems are able to interlock trace minerals, medications, or organics to reduce human error. For micro ingredient systems, lid locks or scanner alarms are able to be used to ensure that the operator is adding the correct ingredients. For pre-mix areas, barcode readers ensure that the operator is weighing up exactly what the formula calls for with each ingredient. These barcode and RFID readers also track all ingredients in terms of usage, lot code tracking and reconciliation. What took hours to reconcile prior, can now be done in a fraction of the time with significantly less labor.

**LOADOUT:** By integrating with the company's delivery ERP systems, WEM Automation control systems are able to reduce the risk of incorrect end-product being loaded onto trailers. In addition, WEM systems can be configured to interlock certain ingredients, such as organics or medications. With the control system always tracking end-product types and trailers used for delivery, the control system is able to prevent certain types of end-product from being loaded after a medicated or organic feed. With the interlocking and fully automated control system, companies are able to rely on the system locking out certain end-products from being delivered. All tracking is carried through from the batching system for a seamless quick recall report if needed as well.

**DELIVERY:** Today, mobile technology and software have allowed WEM to now track end-product all the way to the farm bin. Utilizing barcodes or RFID tags, drivers are now able to instantly know that they are unloading into the intended bin. By scanning the truck ticket and the bin, the control system is able to alert the driver if they are at the wrong farm, house, or bin. In addition to ensuring that the end-product is being delivered properly, the control system is tracking the delivery to tie it all the way back to the batching process. This allows for quick reporting to show all locations of delivered product down to the ingredient level.

## WAREHOUSE MANAGEMENT SYSTEM (WMS)

For over thirty years, WEM Automation has offered traceability and inventory tracking as part of its' batching system. Over the past decade the control system was expanded to make use of barcode technology to automate the process further to reduce the effort and time to manually enter data as well as integrate the technology to automate inventory transactions. Over the past several years, WEM has enhanced inventory control by developing a Warehouse Management System (WMS) to capture the front-end, raw material inventory management, as well as the back-end, finished good inventory in the warehouse.

**RECEIVING – RAW MATERIAL INVENTORY TRACKING:** Incoming material orders from the corporate ERP system are sent to WEM through an

interface. The incoming orders appear on the WEM receiving station. WEM prints barcode labels that are affixed to the incoming material. Individual barcodes with unique identifiers can be used, or placard barcodes can be used for pallet loads. Information such as item number, product description, supplier, production date, lot code, and expiration date can be tracked. As the material is moved to the raw material warehouse location the material barcode is scanned along with the location. The movement and inventory transaction is sent back, real-time to the corporate ERP system.

Additional moves can be tracked whenever the material is moved to a new location, again by simply scanning the material and location barcodes. The WEM warehouse management system has the ability to filter by material or location. This enables operators to quickly know what is in a given location, or what locations they can find a specific material. A material can be put on hold, allowing it to be moved, but not consumed. All material on hold can be viewed along with their respective locations. Mobile computers or devices can be used on the floor to adjust for incorrect information, correct wrong counts, or disposition of a damaged bag. The WEM warehouse management system has multiple levels of permissions and security to track who does what, and when. The system can be configured to push the information to your ERP when the transaction occurs or a preset time interval. Finally, the system can be used to improve the time and accuracy of cycle counts or physical inventory by simply scanning the material and location.

**WORK IN PROCESS (WIP) - INVENTORY TRACKING:** Inventory management in process starts with gathering of materials. A batch order pops up on the fork truck computer, the driver selects the order and is told where the bags are located. The fork truck driver collects the bags on a pallet and uses a wireless barcode reader to scan them. At that point the system tells the ERP that the bags have been moved out of raw material inventory and allocated to that batch order. If bags are being moved to a micro ingredient room, the bags and location are scanned, the transaction is completed. The hand add system prompts the operator and steps through the process with tracking of totes, bags, and check weighs - all controlled within tolerance. Deviations can be done with a supervisor override, all with full tracking. When the premix is complete, the tote is transacted. As the bags and totes are added and blended, another transaction occurs. Once a batch is complete, another transaction occurs as the material moves to the packaging area. WEM sends data to the packaging system through the ERP interface, and the material is packaged. Once packaged, the WEM WMS prints a finished product barcode, and the packing line affixes the barcode to the bag or placard. When the finished good is moved to the warehouse the finished product barcode and location are scanned, moving and completing the inventory transaction to finished goods.

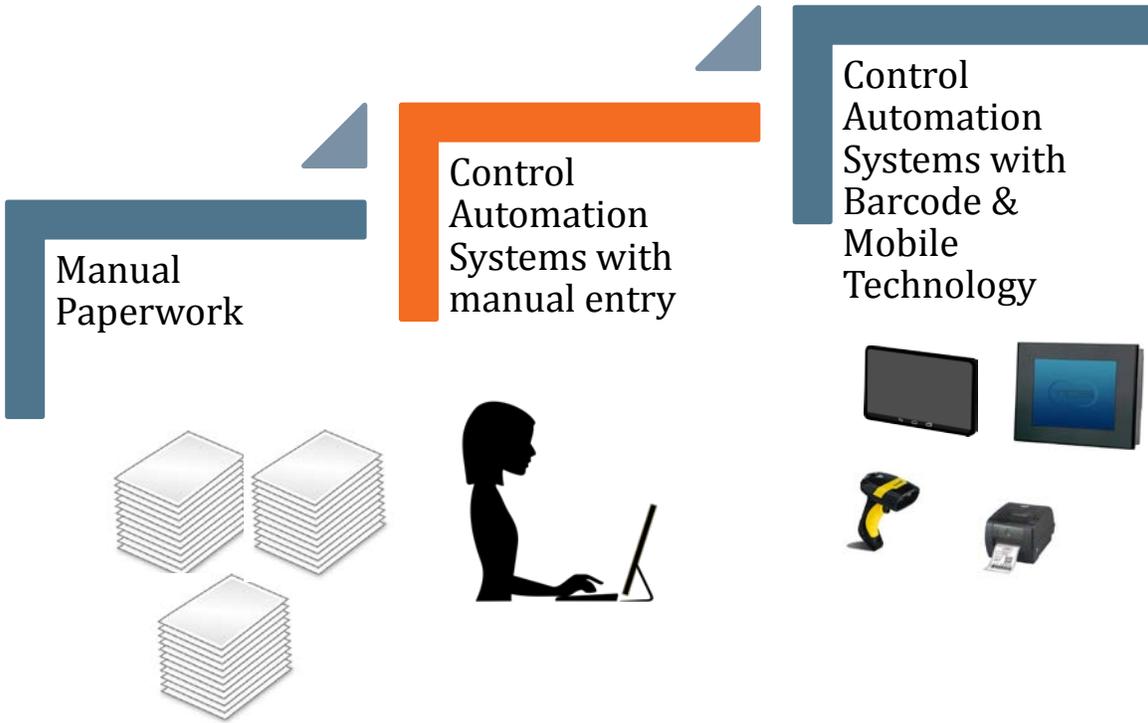
**FINISHED GOODS INVENTORY - WAREHOUSE -TRACKING:** WEM Automation's fully integrated warehouse management system can now automate and manage the back-end of the inventory control. Similar to the raw material tracking, barcodes for finished product and warehouse location are used to track end-product. The corporate ERP system sends out a shipping order. The operator

selects the shipping order from a grid on the WEM warehouse management system. Upon selection of the order, the material is reserved or allocated for this order. The WEM WMS displays the location and lot code of the material and the operator gathers the finished product. As everyone knows, last minute changes can occur to any order. Because of this, WEM has built in a tremendous amount of flexibility to the system. As long as the finished goods are still in-house the order can be simply changed, rather than canceled and re-entered. The WMS is designed to keep up with customer expectations in this 'need it now' culture.

## SUMMARY

Demands on the modern animal nutrition facility will continue to increase, complexity will continue to expand and even with the best intentions, humans can make mistakes. In order to reach the next level of productivity a total system approach needs to be made and the use of advanced technology is key. To meet the challenge, plant managers need to work with automation control companies that have the total solution and are not only good at controlling equipment but equally good at controlling data. WEM Automation has expanded its track & trace and inventory control to now offer a single, fully integrated Warehouse Management System (WMS) that covers your entire facility and works directly with your corporate ERP system.

## PROGRESSION OF TRACEABILITY



## FULLY INTEGRATED TRACK & TRACE WITH WMS

