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A Top 10 List for Meat Processors & Protein Companies When Considering a New ERP System

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Introduction

For enterprise resource planning (ERP) markets, what traditionally has been known as the "meat industry" has expanded into "the proteins industry," which includes many non-meat sectors. The reason for this change is that consumer demand for meat has expanded to other protein-based products that represent alternatives to beef. In their quests for healthier diets, consumers are now looking at non-beef products (such as alpaca, bison, dairy products, elk, equine, goat, lamb, ostrich, emu, pork, poultry and venison and even soy) as sources of protein. Some products in the protein space obviously are not fit for human consumption (such as ingredients for dog and cat food), but for the sake of ERP applications, the requirements are the same. This paper identifies the top ERP features that are necessary for protein and meat processing companies to run their businesses efficiently and effectively.

PROTEINS AND MEAT PROCESSING INDUSTRIES DEFINED

Using Standard Industry Classifications (SIC), proteins and meat processing industries fall into the following categories:

- 201x Meat packing plants
- 2013 Sausages and other prepared meats
- 2015 Poultry slaughtering and processing
- 2022 Cheese, natural and processed
- 2047 Dog and cat food
- 2048 Prepared feeds
- 2077 Animal and marine fats and oils
- 2079 Edible fats and oils
- 2091 Canned and cured fish and seafood
- 2092 Fresh or frozen prepared fish

BUSINESS REQUIREMENTS AND ISSUES

The proteins industry is one of the most complex industries from a manufacturing perspective. It is driven both from the traditional consumer demand pull, as well as the unique problems associated with a push supply chain. In many of the organic companies in this sector, the planner/scheduler must deal with raw material that arrives at the dock every day, including live animals, (cattle, sheep, pork, fish, etc.) similar to an agricultural harvest that must be processed immediately. The challenge is to match this push supply to the current demand while minimizing the overstocking of certain products that may expire before their use or consumption.

Since most of the end-products that come from these companies end up on the supermarket shelves, the demand curve is constantly skewed by changing consumer demand. Add to that the challenges of short shelf life for fresh products and the ever-changing growth in value-added products (pre-cooked and ready meals), and the planning options become quite complex. All proteins industry players typically need to deal with:

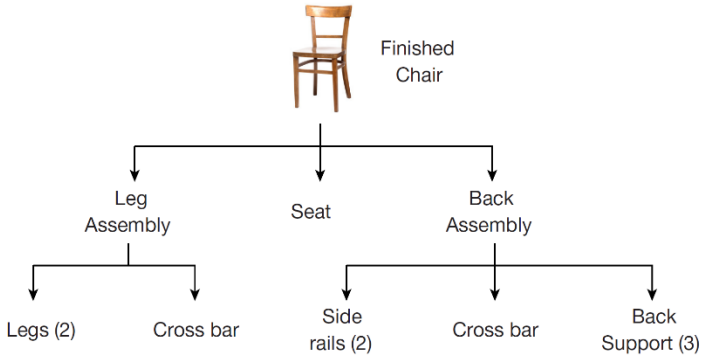
- Matching push supply and pull demand
- Minimizing or managing the production of by-products resulting from production
- Selling as much high-margin fresh products as possible
- Managing the variability of incoming supply (timing, quality, cost)
- Minimizing high carrying cost inventory (i.e., frozen products)
- Producing value-added (high-margin) products whenever possible
- Preventing missed orders, or short orders

This paper presents the unique issues and requirements found in this special market, and provides a “Top 10 List” of things to consider when contemplating a new ERP solution.

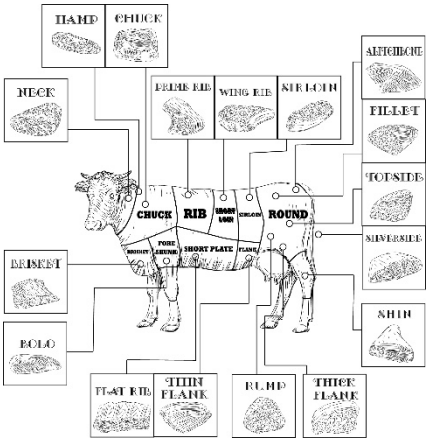
TOP 10 LIST

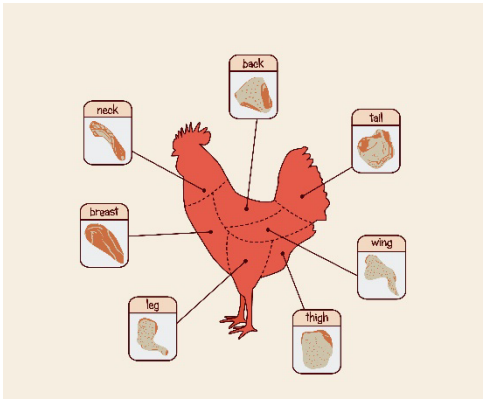
1- INVERSE BILL OF MATERIALS

Most discrete manufacturing applications are designed to create a single product – they are not designed to disassemble a raw material into several products. A bill of materials (BOM) defines the parts required to assemble or build one end item..



The inverse bill of materials starts with one main raw material and disassembles it into its many parts. In the proteins industry, a raw material may be a beef primal, a whole chicken, or a breed of fish. The examples below illustrate two of the more common inverse bills for beef and poultry





This disassembly bill must also account for not only the valuable parts or co-products output but also the waste or by-product outputs. Often those by-products have to be disposed of at a cost to production.

ERP needs to understand how to plan for finished goods as well as the associated co-products. Often co-products may exist on a recipe or formula of more than one finished good. For example, a chicken wing co-product may exist on the disassembly formula for a whole chicken as well as on the disassembly formula for a front quarter chicken.

2- CATCH WEIGHT (CW)

Many buyers are confused when they hear the expression catch weight (CW) since many ERP vendors use the expression "dual units of measure." The term "catch weight" originates from the seafood industry when large shiploads of freshly caught fish arrived in the processing plant. The plant contracted for a large number of pounds of fish, but they never knew what combination of fish they would receive until the catch was sorted at the plant. The sort identified how many pounds of fish, by species and grade, and that determined the pay for the fishing boat captain and crew. The original expression catch weight applied to the total weight of the catch, and has now been applied to other proteins industries such as beef, pork and poultry.

In a traditional meat company, particularly on the fresh side of the business, products are tracked by actual weight throughout the entire supply chain. These products, which do not have a nominal or net unit weight, are identified as catch weight items. Throughout this document, the term "actual weight" will be used to describe the catch weight requirement. The issue of variable weights permeates the entire supply chain. Companies must have the ability to value, inquire, commit to orders, cost, receive, produce, place orders, price, ship and invoice by actual weight. The ability to handle variable weights is a fundamental requirement that must be properly and fully handled by the core transaction ERP application.

When some ERP vendors hear this type of requirement they tout their dual of measure functionality to cover this requirement and move on to the next requirement.

Dual units of measure often refers to establishing a unit of measure for inventory and a different unit of measure for purchasing, sales or production and uses a 'static' conversion factor to calculate between the two units of measure. True catch weight functionality provides not only the ability to have more than one unit of measure but allows for the quantity in a catch weight unit to have different quantities in an inventory unit of measure. It is not a static or linear calculation.

The catch weight unit of measure is usually some type of container such as a bag, box, case or carton. The inventory unit of measure is usually some type of weight measurement. For example, a basket (CW unit) of large shrimp may weigh between 9 to 11 pounds and may contain between 90 to 165 shrimp. It may have a target weight of 10 pounds and that weight may vary within the tolerance that has been established for large shrimp.

Meat or pork processors run their businesses differently than, for example, poultry, fish or dairy companies, so in some cases a few minor changes may be necessary to accommodate unique business processes. However, most catch weight-based companies share about 90% of the same ERP functionality.

Catch weight functionality can also vary in its ability to identify inventory. Some catch weight functionality can only provide an aggregate view of its inventory. For example, it may show five boxes of large shrimp that totals 51 pounds but it may not know the exact weight of any particular box of shrimp until it is actually weighed. Other ERP vendors may provide additional modeling for catch weight that allows users to define each box by serial number identification so that the actual weight of each box is also known. So those five boxes of large shrimp may total 51 pounds but it includes one box each at nine pounds, two boxes at 10 pounds, and two boxes at 11 pounds.

Catch weight functionality should permeate throughout the entire transaction backbone of an ERP system, including:

- Manufacturing and in Work in Process
- Purchasing and Receiving
- Warehousing
- Sales Orders and Shipments
- Invoicing and Returns

3- PRODUCT VARIABILITY

Product variability is a given with process companies. In discrete industries, the requirements are more "cut and dry" than with process. ERP needs to be capable of dealing with and managing product variability with flexible characteristics for both raw materials and finished goods. Often these characteristics are defined at a lot level which may also represent the quality aspects of the product.

Potency Management is a key differentiator when it comes to comparing ERP systems. Products may possess certain characteristics that can vary from lot to lot and may also influence how much of that material is needed, as well as it may affect other ingredient quantities. For example, protein, in the form of amino acids, may be defined as a potency attribute so that it can be tracked and balanced for production, and to make sure the established levels are present in the finished product. In some cases Fat may be considered as a potency attribute so that when making ground beef that needs to be 73% Lean (27% Fat), 80% Lean (20% Fat), 85% Lean (15% Fat) or 90% Lean (10% Fat), the proper mix of other ingredients from the beef primal may be calculated.

ERP for process manufacturers should provide the ability to record various characteristics for each lot that is received or produced and have the ability to inherit these characteristic values to the finished goods and co- products that are produced using these materials. Shelf life dates should also be part of this inheritance as needed. Some characteristics may be manually recorded based on the receipt of a Certificate of Analysis (COA) from a vendor or may be automatically updated as a result of Quality Control (QC) test results within the ERP application.

4- SHELF LIFE MANAGEMENT

The concept of shelf life is a huge issue for process manufacturers. In the proteins space, materials can, and will, expire if not processed in a timely manner. In process manufacturing, material is often tracked by lots. When that material is defined as a shelf life controlled item, it will have an expiration date determined once the item is received or produced, and once that expiration date is reached, the inventory is considered as expired. Shelf life raises a lot of questions and options from a planning and scheduling perspective, but this document focuses on what happens in an ERP system that can handle shelf life requirements.

First and foremost, the application must support visibility into the expiration dates of the lots of inventory. Most inventory-related ERP transactions must consider expiration dates to determine which lots of material to use. Expired materials can be placed in a review status to eventually be scrapped or reworked, downgraded or disposed.

The most common picking technique in process manufacturing is first expiry first out (FEFO). This technique can further be refined by defining how an item would utilize this method, whether to sort inventory lots based on the earliest Expiration date or to sort those inventory lots based on the earliest Best Before date. A Best Before date is the date on which the product would be “Best” used or sold. In some situations this could referred to as a “Sell By” date. This doesn’t mean the product has expired. The intent of these two dates and by having them separated is that once the product is sold that there should be a certain amount of useful life in the product before it reaches its expiration date. In addition to this ‘Best Before’ date, which can be described as when the product should be used or sold, is an offset date that is used to define the number of days a customer may desire for the product to be sellable. For example, a fresh fish distributor may need to have five sellable days once a product is received ` before it reaches its ‘Best Before’ date. Once the customer has purchased the product, there are additional days before the best before and expiration date within which it would be used or consumed. Many ERP systems are not capable of offsetting these dates properly and any batch that has reached its ‘Best before’ date might be reserved and picked for a customer order and by the time it reaches that customer it may have very little or no time before reaching its best before or expiration date.

5- LOT TRACK AND TRACE

Despite the best efforts to design, manufacture and sell safe and reliable products, the possibility still exists that defective products may reach customers. Unless action is taken promptly, these defective products may pose a severe financial risk and legal liabilities. Proteins/meats-based manufacturers obviously must address lot track and trace, but most food companies also need to provide this information in case of a recall or Federal Drug Administration (FDA) audit. An ERP needs to quickly provide actionable information when a complaint is received which results in the need for a recall. Recalls may be conducted on a firm's own initiative, by FDA request, or by FDA order under statutory authority.

A company's survival may depend on how well and how quickly it can respond to the first notice that a product recall may be necessary. Product recalls are expensive, but trying to conduct a product recall without adequate planning can be even more costly. Many companies conduct mock recalls or dry runs to test the integrity of their ERP's tracking and trace abilities as well as the disciplines associated with conducting a recall.

The ERP system should have the ability to not only record the quality attributes and history of each specific lot, but also provide the ability to trace each lot that may have been purchased, used in production and ultimately shipped to a customer. Often lots that were received or produced adjacent to a suspect lot are also scrutinized and examined for possible recall as well.

An ERP system must support both forward and backward traceability. Backward traceability is needed when receiving complaints regarding finished goods (i.e. from customers), and forward traceability is needed when receiving notice from vendors about defective products that may have been shipped.

6- INTEGRATION CAPABILITY TO SHOP FLOOR EQUIPMENT

For many process manufacturers there are many situations where products are manufactured in bulk and then are packaged into smaller containers. Often these bulk products are not designed to be stored for long periods of time and need to be packaged as soon as manufactured or are stored in temporary storage until completely packaged.

ERP systems need to support the planning of these types of products. These products may represent a mix of a push supply chain where the materials have to be packaged once manufactured or of a pull supply chain where the packaged items are driven either by forecasted or direct customer demand. ERP needs to be able plan for the multiple finished goods that contain these bulk intermediate products. In some situations, these bulk materials may be packaged in 'brite' stock for later labeling as needed.

Once packaged a customer service representative (CSR) may need visibility to not only the product that a

customer may be inquiring but other products that contain the same bulk product where there may be inventory deficiencies. For example, a customer calls to ask for 50 20 pounds bags of sugar. The CSR needs to be able to see within their ERP system that they don't have enough on-hand of the 20-pound bags. However, the CSR is also able to see that there are enough 10-pound bags and also of the 50-pound bags of sugar that might also satisfy the customer's requirement.

7- INTEGRATED QUALITY CONTROL AND QUALITY MANAGEMENT

Quality control is a huge issue for proteins/meat manufacturers and requires integration into several areas of an ERP system. Quality management is performed in multiple areas, including incoming receipts, inventory warehouse levels, work in process, finished goods receipts, as well as with returns and non-compliance issues.

Consider an example where a processor might set up its quality system to test for incoming receipts. This processor might determine that certified vendors' products do not need to be tested for certain characteristics since they can provide the COA to prove they have already tested the products. They can be assigned accordingly so that the process ERP system will only request tests attributes. Non-certified vendors' products are assigned so that those products would require additional tests.

This level of quality control should be available at any part of the ERP system. On the shipping side of the plant, the same concept of tests can be assigned to customers. This concept is called specifications matching, and when products are sold to individual customers, the same application of quality testing will apply to finished goods.

8- COSTING CONSIDERATIONS

A good process ERP system provides the ability to cost products correctly because it was designed to support formulas as well as a traditional bill of material. If the initial raw material is an animal carcass, the downstream co-products must be driven by the standard cost (or whatever costing methodology is being used) of the starting raw material. Assuming the use of an inverse bill of materials concept to disassemble the carcass, here are the costing options that should be taken into consideration.

Co-products: Co-products should be allocated a certain percentage of the overall costs to each co-product that is produced. However, in process food companies it is widely known that the co-product output quantities are never exactly met. In discrete industries, a plan to make 10 chairs normally produces 10 chairs. In process food companies, using the beef primal example above, the 200 pounds of Ribeye steaks that we expect to get from the 1000 pound beef primal is an estimate of what we plan to produce. Rarely is that the case. Often the output quantity will be higher or lower depending on the quality of the input and the sizes of the steaks being cut. So, the ERP needs to take the actual output into account when allocating overall cost to each of the co-products.

By-products: By-products are those items that are produced as a result of producing other items. These by-products are considered as waste and typically are disposed of. By-products are not sold, so that would not have cost allocated to them during production. However, by-products may contribute costs to production due to the cost of handling and disposal. Some by-products may be consider toxic or not necessarily good for the environment and are very expense to get rid of. ERP needs to be able to account for these costs and allocate them appropriately to the usable items being produced.

9- YIELD MANAGEMENT

Yield is the amount of good or acceptable material available after the completion of a process. It is usually computed as the final amount divided by the initial amount converted to a decimal or percentage. In process food manufacturers, it is usually related to the parent item to determine how many units should be scheduled to produce a specific number of finished goods.

For a given item the scrap factor and yield factor will equal 1. If the yield factor is 95% then the scrap factor is assumed to be 5%. ERP needs to be able to use this yield factor in planning and for costing purposes so that the correct amount of the finished goods are planned, and thus the correct amount of raw materials and other components are accurately considered in the material planning and costing calculation.

During the production process some ingredients will partially or completely disappear due to shrink or evaporation or combine with other ingredients to create a finished product that is much different than the sum of its parts. In some production processes yield may be affected by transferring material from work center to work center or through transfer lines. Some loss can be expected with particular pieces of equipment where there could be a required amount of material that must be consumed and lost just in the initial setup of the production run.

ERP systems for food manufacturers need to account for yield in both the planning arenas and in the areas of costing. A plan for 450 units of a finished good that had a 90% yield would produce 405 units – which is not be enough. The ERP should plan to complete 450 units, which would require enough ingredients to actually make 500 units due to the 90% yield factor. The costs of all of those materials are rolled up into the cost of the finished good so that the yield is accounted for in that cost.

Also, an ERP's production functionality needs to capture actual and detailed material consumption as well as WIP / finished good produced quantities, as this is required for useful yield reporting. If the detailed production transactions are captured, proteins manufacturers can then produce effective yield reports that can be used to monitor the quality of materials (in terms of percentage of high-value edible product) and the performance and efficiency of their production lines.

10- CFR PART 11 COMPLIANCE

Bioterrorism is such a prevalent issue today that protecting the food supply is at the top of the FDA hot list. As a result, the FDA is now requesting that many of the compliance issues originally built into ERP applications for pharmaceutical companies now be applied to food and beverage companies.

CFR Part 11 components needed to pass an FDA audit include:

Electronic signatures: Originally designed to protect pharmaceutical companies from tampering at the formula level, this requirement has extended to other parts of an ERP system. Essentially this means that a user can see the data (e.g., a formula), but if they try to update or change it, it will prompt them for an additional password.

Audit trail: In early versions of ERP systems, the audit trail only applied to changes that affected costs or value within the system (inventory for instance, not addresses or name changes). In the new world, any change to the ERP application must be captured and documented.

Calibrations management: In ERP, quality control instruments must be calibrated on a regular basis. Plant maintenance applications need to calibrate machines that touch product (outside of scope for this paper). Consequently, if a test is performed with an ERP's quality management application, the manufacturer must be able to identify if that test was done with a calibrated instrument.

Time out: Terminals left unattended need to turn off automatically or reset to request another password after a set time period.

SUMMARY

The requirements for an ERP application in the proteins/meat processing industry are can be complex. By following these guidelines outlined in this white paper when evaluating and selecting a process ERP system, proteins and meat processors can rest assured of selecting a system with the core functionality to address their specific industry challenges.

For functionality specific to the proteins/meats industry, see the addendum in this white paper titled, A Functional ERP and APS Evaluation Checklist for Proteins/Meat Processing Companies.

An additional white paper, Organic Supply Chain Mangement, is also available.

CONTACT US

About Alithya

ALITHYA GROUP INC. IS A LEADER IN STRATEGY AND DIGITAL TRANSFORMATION IN NORTH AMERICA. Founded in 1992, the Company counts on 2,000 professionals in Canada, the United States and Europe. Alithya's integrated offering is based on four pillars of expertise: strategy services, application services, enterprise solutions and data and analytics. Alithya deploys solutions, services, and skillsets to craft tools tailored to its clients' unique business needs in the Financial Services, Manufacturing, Energy, Telecommunications, Transportation and Logistics, Professional Services, Healthcare, and Government sectors.

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