

**Noel, as a benchmark company in the meat and food sector, offers its customers the highest standards in food safety and quality, thanks to its philosophy of constant innovation.**



Noel offers solutions for your lifestyle. From the most traditional products, produced with the best technology, to the most advanced solutions in ready-to-eat products. Integral control of the process, at all times, from the very start.

### **Background / Problems**

Noel carries out a piece-by-piece monitoring of its entire cured ham process by means of barcode labels.

When the process is finished, the pieces arrive at the deboning line. Each piece is weighed before entering the line. After deboning and trimming, the pieces are weighed again to determine how much product loss has occurred during the process.

Because of the way the line is organized, it is impossible to carry out further monitoring beyond this stage, which imposes limitations on control of the process.

The barcode labels cannot withstand the deboning and trimming stage, and so must be removed before the pieces enter the line. Consequently, traceability of the individual ham is lost at this point, since this type of identification is not suitable for undergoing subsequent processing.

In summary, the system used does not allow further processing data to be obtained, nor does it provide for piece-by-piece traceability throughout the process from start to finish.

### **Objective**

Optimization of the cured ham deboning and trimming process by means of monitoring the time of each operation and monitoring individualized product losses, piece by piece.

### **Study**

The company's technical personnel conducted numerous tests in order to determine what type of technology would be best suited for application in their line. Finally, due to the reduced work space, the extreme conditions of the different processes and the possibility of recycling and reusing the material, they opted for RFID technology.

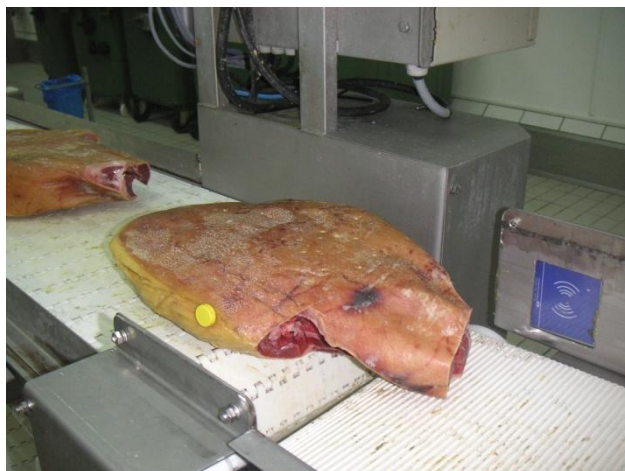
This technology provides them with:

- A controlled environment in which to apply the identification technology.
- The sturdiness to withstand certain conditions.
- Recording of large amounts of information.
- Reusable RFID tags.

### **Equipment and Material**

To optimize and monitor the cured ham deboning process, certain strategically located and interconnected elements are needed:

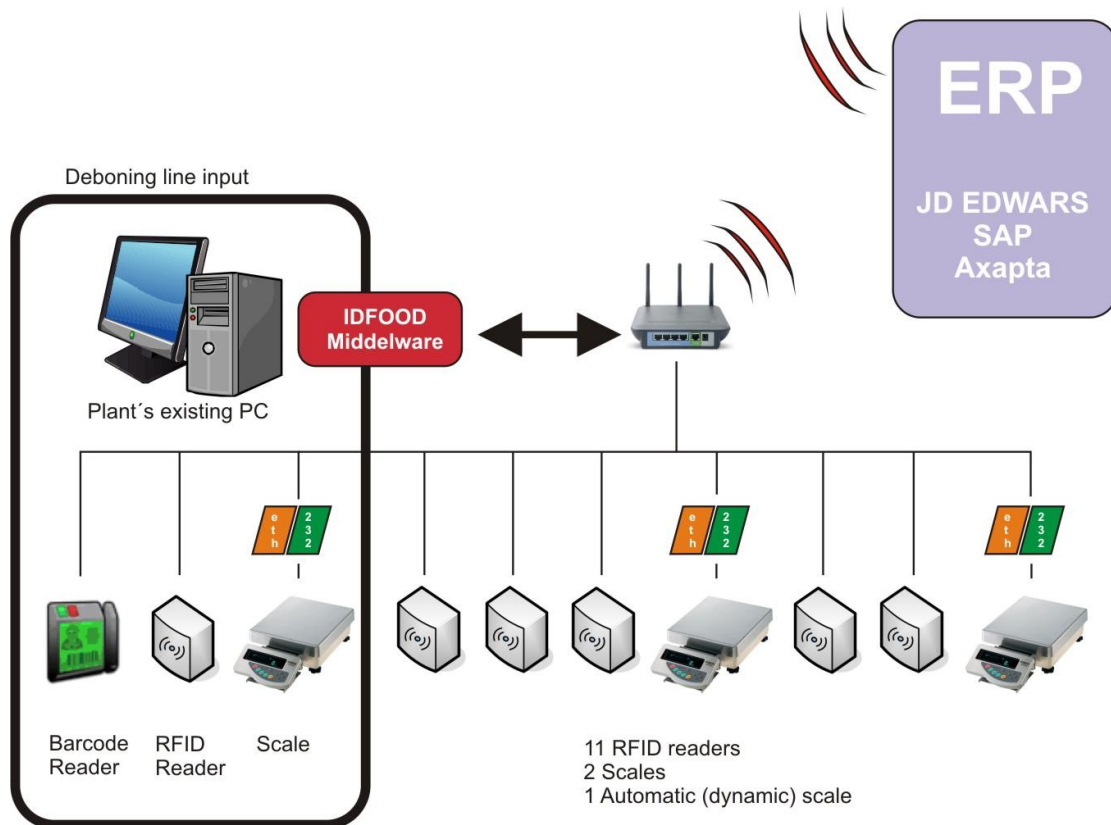
- RFID readers designed and developed by IDFOOD, located at each work station.
- Industrial weighing scales. One is placed at the start of the line; a dynamic scale is placed between the deboning zone and the trimming zone; and the last scale is located at the end of the process.



- HF tags encapsulated with food-grade material. At the end of the process, the tag is recovered, cleaned and reassigned to a new piece.



The Ethernet connections between the RFID readers, the scales and the IDFOOD middleware allow for utilizing the plant's already-existing communications structure.



### **Description and Operation**

### **CLASSIFICATION:**

The deboning line has a number of different work stations. Each of them is equipped with its corresponding RFID reader. Before starting the process, each operator is identified by means of a personalized RFID card. In this way, the system can register the operator situated at each work station.

After having undergone the curing and drying process, the hams arrive at the line identified by a barcode label. The first step is to correlate said label, which will be removed, with the tag that will replace it. Once this correlation has been made, the tag is placed on the ham at a strategic point that will facilitate a quick and easy reading, the piece is weighed and then left on a conveyor belt.

All the initial information (barcode, RFID code and initial weight) is recorded and integrated in the plant's data system, by means of the middleware developed by IDFOOD.

### **DEBONING:**

The hams are taken to the deboning area on a conveyor belt. There, the operator picks up a piece and reads its identification tag by means of the reader located at his work station. This reading does not involve any additional action on the part of the operator, beyond the movements he already performs, since the reader is located in such a position that the tag can be read with the simple act of moving the ham from the conveyor belt to the work station.



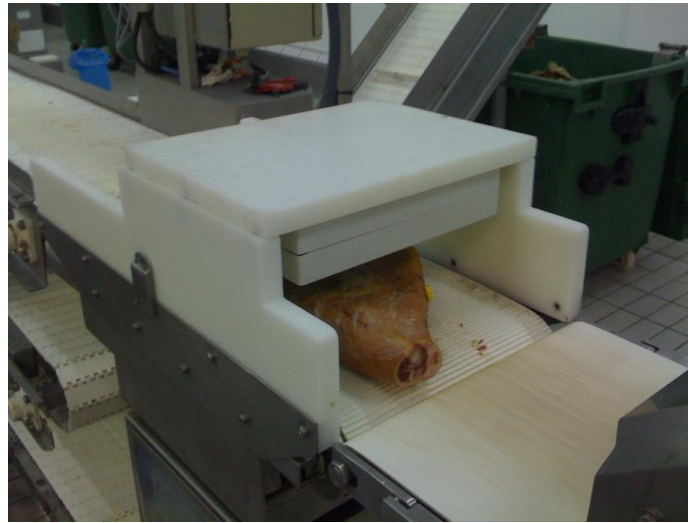
Each reading is recorded in the software, which allows the system to carry out different studies of this stage:

- Time used by each operator to complete a certain task.
- Number of pieces processed by each operator in a certain period of time
- Etc.

### **INTERMEDIATE WEIGHING:**

Once the pieces have been deboned, they are placed back on the conveyor belt, which is equipped with a dynamic scale that weighs the hams automatically, with no need for operator intervention. An antenna strategically located on the scale

facilitates reading of the tag and correlation of the new weight with the identified piece.



These data provide the management system with detailed information about the weight loss of each piece that resulted from the deboning process, as well as the average loss attributed to each operator in this process.

#### **TRIMMING AREA:**

Once the weight of the deboned ham has been recorded, the piece arrives at the trimming area, where the operator must remove the RFID tag and place it in an "ashtray" type of reader. At this stage of the process, when a good part of the product's outer skin is removed, the tag cannot remain on the piece. Once the product has been trimmed, the tag is put back on the ham.



## **FINAL WEIGHING:**

The last phase of the deboning process is pressing, and subsequent weighing of the piece. At this stage, the system provides information about the weight loss undergone in the trimming phase by each individual ham, piece by piece. Data are also provided on the loss for each piece in the overall process.

Finally, the tag is extracted from the piece and placed in a final reader, of the "funnel" type, to be recycled and reused in another piece.

At this stage, a conventional barcode label is generated, in order to guarantee piece-by-piece traceability from this point onward.

## **BENEFITS OF THE PROJECT**

- 1) More detailed information regarding the yield of cured ham in the deboning and trimming process:

The implementation of this system has made it possible to determine which batches result in better yield at the end of the process, including the curing and deboning stages. The data collected provide reliable statistics about the quality of raw material obtained from different suppliers, which can assist in negotiating prices with a supplier of lower quality raw material.

- 2) Monitoring of production times in all operations of the deboning and trimming process:

By means of the software developed by IDFOOD for management of the ham readings, the following real time information is provided:

- Productivity of each operator.
- Number of pieces processed in a certain interval of time.
- Number of pieces processed from the same batch.
- Inventory based on number of pieces processed.
- Etc.

- 3) Monitoring of times and quality to determine operator bonuses:

The system provides for centralized monitoring of the number of pieces processed by each operator, establishing the quality of his work based on the amount of loss generated. This facilitates a more balanced management of bonuses, since not only the number of pieces is taken into account, but also the quality of the work done.

- 4) Monitoring regularity of raw material based on processing losses :

By means of the software developed by IDFOOD, the processor can determine the degree of regularity of the quality of raw material provided by a supplier. In this case, the concept of quality is based on the percentage of loss resulting from the deboning and trimming process.

A comparison is made with previous batches of the same product provided by the same supplier. If there is a significant variation in losses from one batch to the next, the customer can negotiate the cost to adapt the price to the reality of the product received.

5) Individualized ham identification:

The software allows the processor to obtain, both in real time and in regard to previous processing already carried out, all the information concerning a particular piece of ham. These data include its weight at the different stages of the process, the corresponding losses, the times used in each operation, etc.

6) Tags that are reusable and easy to clean:

Being able to reuse the tags at the end of the production line is a key factor to be taken into consideration when establishing the cost of implementation.

The use of simple tools for extracting and inserting the inlays, together with the possibility of using the cleaning systems already installed in the plant to clean and recycle the tags, means the project can be implemented without having to replace or modify any of the tasks in the conventional process.