



## ERP and Materials Traceability

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In today's world, businesses have increasing varieties and volumes of products which they manufacture and sell. On a given day, hundreds of job orders are issued, and associated purchase orders are created. Number of suppliers are on the rise, and businesses also desire to increase the total number of customers to which they deliver their products. In such a system that is already difficult to monitor, assume now that we come across a problem. At the time we become aware of the problem, we can determine its cause, but how likely is it that we can also determine the source of the problem? Some of the questions that we may be faced with are the following:



- If it is faulty workmanship, who in our workforce committed it?
- Which of our labor staff should we identify for additional training?
- If it was a worn-out die, on which of our equipment was it installed?
- What other manufacturing have we performed using the same die?
- If the raw material had defects, which supplier was it purchased from?
- Did we perform other manufacturing using material from the same lot?
- Are the completed products still in our warehouse, or have they been shipped?
- To which customers have they been shipped, and when?

If traceability is not implemented in our business, finding out the answers to these questions is either impossible or very time consuming. By linking the necessary documents to each other, Materials Traceability implements tracking of the materials flow that takes place in purchasing, production, warehouse transfers, and delivery processes. Prior to attempting to implement such a system, the enterprise should first review its processes and adapt them into a form suitable for traceability. Then the necessary configuration in the system can be performed, resulting in the ability to obtain traceability reports when the required data inputs are performed during the business processes. In this article I will discuss realizing reverse and forward traceability, and its benefits.

How do you provide for materials traceability? Before we can talk about the capabilities of the ERP system in use, we have to make sure that the business processes of the organization support materials traceability. While some organizations have processes that support it

traceability, some provide only partial support.

As an example, if we track our raw inputs on a per lot basis, and then put all lots in a vessel and mix them up, we will have lost traceability if we manufacture semi-finished goods obtained piecemeal from the mixture in the vessel. Due to the production method used, this situation is impossible to overcome. As another example, consider metal plates produced and used within a plant. The plates, which are semi-finished goods, are put in large boxes, which are then placed at any available location in a warehouse, and finally picked up at random when needed. This is another case where traceability has been lost; however, traceability in this case can be implemented if the box size is chosen such that a single box will contain one complete lot, and the boxes are stored in and retrieved from the warehouse in an organized fashion.

Organizations that desire to implement materials traceability through ERP systems should first condition their physical environments to support this effort. In the second example given above, the re-organization within the plant allows traceability to be achieved; in the first example, the organization has to decide how much of a traceability is desired.

For an organization using an ERP system, achieving traceability at first involves implementing lot-based tracking within its purchasing processes. When we review the circulation of materials within an organization, we observe that initially they are accepted into the warehouse using a shipping ticket. When they attain their final product form, they are delivered to customers again using shipping tickets. Implementing traceability within the ERP system is achieved by correlating behind the scenes these two sets of shipping documents (incoming and outgoing shipping tickets).

During purchasing, the ID number can be manually assigned for a lot, or can be assigned by the system using a counter. During any transfers, material lot IDs should also be tracked, in addition to material type and quantity data. During material picking for job orders, materials lots may be determined automatically by the system using such methods as LIFO and FIFO; otherwise, the lots specified manually should be entered into the system. Tracking using barcodes will help businesses speed up such operations. Semi-finished and finished goods will be monitored in a similar manner through job orders. Finally, when goods are shipped to the customer, the shipping ticket should be completed to note the lot numbers associated with the products that have been shipped.

After documents have been linked in this manner, forward and reverse traceability will now be possible. To illustrate this using an example, assume that you have been informed of a product defect in a shipment to one of your customers. At that point, the information you should request from the customer should be the date the products were purchased. Your goal is to be able to identify the shipping ticket for the product referred to by the customer. By locating the shipping ticket, you can execute reverse traceability. All job orders and purchase orders associated with the shipping ticket can now be viewed. As part of the job order, you can identify the personnel who worked in producing the lot in question, as well as the production date and the equipment (machinery) that was used. As a result, the machinery in question can be checked, and the personnel involved may be requested to enroll in supplemental training. Additionally, you can drill into the job order and obtain the data associated with the quality assurance checks that were performed following each manufacturing operation. You can review the final quality assurance data for the delivered product.

If the cause of the defect is not in manufacturing but in the materials purchased, the shipping tickets of the materials used in the manufacturing of the defective product can be accessed, and

the supplier and purchase date information can be obtained. For the shipping ticket in question, the data associated with the quality assurance checks performed at the time the goods were received can be accessed. After reverse traceability has been performed and the source of the defect has been identified, forward traceability can be initiated, which will reveal other products that may have been affected. Continuing with the same example, you can view the job orders where the same defective raw material were used. You may even be maintaining semi-finished goods in your internal inventory manufactured with the defective material. Being able to identify the warehouse and location information for such semi-finished goods will be essential to you. In this manner, you can perform quality assurance checks on these goods and re-manufacture them as you see fit. Another possibility is for other outgoing shipping tickets to exist for the same defective raw material, indicating that products have been already shipped to yet other customers. In such cases, you can proactively contact these customers ahead of time to offer replacements, before they contact you with complaints.

The above cases constitute useful examples of the benefits of traceability. When the purchasing and manufacturing processes, and the materials transfers and deliveries are presented as disjoint processes, proper analysis of problems seem to be impossible. Materials Traceability allows these processes to be united together. As a result, we are able to analyze situations rapidly and intervene on time in case problems do arise. Traceability increases both manufacturing productivity and the quality of the services offered to customers. Traceability reports provide data for further analysis of supplier evaluations, quality assurance of processes, and personnel and equipment allocations. With such functionality, Materials Traceability has become an important and essential tool for customer-focused businesses that operate in competitive environments.

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