Tracking Sheets, Rolls, and Lengths of Material

Introduction

Tracking dimensioned inventory, such as sheets, rolls, and lengths of material is easy enough provided that you only have to track these in a few different sizes, such as 4'x8' sheets of plywood, 30" wide rolls of plastic, and 6' lengths of steel pipe. In this case you simply create a separate part number (or SKU) for each size that you keep in stock.

But what happens, if you need to track offcuts, such as a 2'x3' piece of plywood, a 12" wide roll of plastic left over from slitting a 30" wide master roll, or a 2' length of steel pipe that is returned to stock?

One approach is to create a separate part number for each possible width and/or length you could have in stock. This quickly becomes an overwhelming task, especially for make-to-order manufacturers who may have an essentially infinite number of sizes, left over from manufacturing processes.

Another approach is to use a common part number for a specific material, with a unit of measure such as square feet or pounds, that is common to all sizes. This works well from an accounting point of view but not from an operational viewpoint. You cannot cut a 6'x1' piece from a 4'x4' sheet, even though there are more square feet than are needed in stock.

In this white paper, we describe an approach used by the BellHawk software to solve this problem by tracking each sheet, roll, or length of material as a container of materials with dimensions.

Tracking Dimensioned Materials

In BellHawk, we start by assigning a common part number to all sizes of a specific materials. Thus we might use a common part number for all sheets of ½" plywood, or all rolls of 4mm green plastic, or all lengths of ¾" stainless steel pipe. Then we use a primary unit of measure (UOM) that is applicable to all different sizes, such as square feet, with possibly a conversion factor to pounds.

This base part number is what we enter into the accounting system as an inventoried item and into BellHawk as an item master part. This is so that data about inventory values and quantities can be automatically exchanged between the barcode tracking system and the accounting system.

We also treat each sheet, roll, or length of material as a container. This is so that we can use license-plate tracking principles to track each individual sheet, roll, or length of material. Please see companion white paper on license-plate container tracking principles for details of this methodology.

Then we attach attributes of length and width to each of these "containers". This enables BellHawk to track:

- A 2'x3' sheet containing 6 square feet of ½" plywood
- A 100' of 30" wide roll containing 250 square feet of 4mm green plastic

In each case, we use a common part number for all the different sizes of a particular material in stock. This enables users to see at a glance all the different sizes they have in stock, so they can make efficient use of off-cuts for future jobs.

Each "container" of material is typically tracked by attaching a unique license-plate tracking barcode to the sheet, roll, or length of material. This is so that the barcode on a sheet can be scanned when it is withdrawn from stock and also when the offcut is returned to stock (using the existing tracking barcode or by attaching a new tracking barcode to the offcut piece).

Special Cases

1. With materials that only have length, such as lengths of steel pipe, we will typically use length as the primary unit of measure. In such a case we will carry along a weight conversion factor, such as in pounds/foot, on the BellHawk item master record, so BellHawk can report inventory changes in pounds as a common unit of measure to the accounting system.
2. With materials, such as sheets, with both length and width dimensions, and a primary unit of measure in square feet, or some such area measure, BellHawk can automatically calculate the area of materials in the container based on the dimensions entered, when each container is entered into inventory. If there is a weight conversion factor on the item master then inventory changes can be reported in pounds to the accounting system.
3. With materials such as rolls that have a dimension of width, but not length, and use length as the primary unit of measure for each roll, then the length is recorded as the quantity on the roll and the width has no impact on the computation of the primary unit of measure.

   However, when inventory changes have to be reported to an accounting system then the width dimension of the roll and the length have to be used to compute an area to report to the accounting system. Also, if there is a weight conversion factor on the item master record, for the material on the roll, then this is assumed to apply to a reference width also entered on the item master record. These can then be used to report changes in inventory, measured in weight for different widths of material, to the accounting system.

Commentary

By treating each sheet, roll, or length of material as a container, and tracking the length and width of each container, we are able to track the inventory of these dimensioned material in all its different sizes. Having visibility of all the different sizes of a material available in stock enables the efficient use of offcut materials in manufacturing processes and minimizes wastage due to using new sheets, rolls, or lengths being used when off-cut materials would have sufficed.

By using a common base part number for all containers of a particular type of dimensioned material, we are able to only use a limited number of item master part numbers in both the accounting and tracking system. This dramatically reduces the amount of initial data entry work needed in both systems. Also, if a unit of measure, such as for area or weight, is used in both systems then inventory changes recorded in the tracking system can be automatically transferred to the accounting system, no matter what changes in length or width of materials occur.

Tracking offcuts and accurately recording their production and consumption in manufacturing processes can dramatically improve the accuracy of job and inventory costing. This is in contrast to the common practice of only recording the consumption of new rolls, sheets, or lengths of material into jobs and ignoring the production or later consumption of offcuts on other jobs, which can result in major errors in costing jobs.

Author

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