Part Numbering Mayhem

A White Paper by Dr. Peter Green

Introduction

Whether you are a manufacturer, an industrial distributor, or in the building trades, part numbers play a critical role in everything you buy, make, and deliver.

It used to be easy. You always purchased Widgets from Widget Co and so you used their part numbers for different types and sizes of widgets. The same part number appeared on receiving documents, bills of materials, quotes, and orders from your customers. It also appeared as the corresponding Item Master Part Number in your ERP or accounting system.

Everyone knew that a WD30BL was a 3" Black Widget.

Then along came the pandemic, wars, and supply chain shortages. You go to reorder another 100 WD30BL Widgets, only to find that Widget Co outsourced their manufacture to a subcontractor in China over a decade ago and that manufacturer is now shut down due to pandemic restrictions. You are told that WD30BL are on backorder and that Widget Co. may be able to deliver 50 of them in 6 weeks, with the balance sometime in the future.

There is an equivalent part that is made in Taiwan by East Asian Mfg Co with a part number 45.67.89.12, which is distributed in the USA by TDisco, who sell them in boxes of 10 with their internal part number of WX324 for a box of 10. You can order all 6 boxes that TDisco has in stock for delivery next week.

Now we have mayhem.

1. The purchase order we issue to TDisco is for 6 Boxes of WX324

2. We receive 5 boxes of 45.67.89.12, with one back ordered, with part description in Chinese.

3. Now the receiving person has to enter these into inventory as 50 XWD30BL, without making a mistake.

4. But is the 45.67.89.12 identical to our old WD30BL or only a replacement part that is not identical?

   This can become critical when engineering has designed around some specific characteristic, or the customer relies on the part being delivered being identical. Maybe the new 45.67.89.12 has a thickness of 16 mm and the old WD30BL has a thickness of 5/8", which is close enough for most applications but may result in it not fitting in some applications.

5. How do we enter all of this into our ERP or accounting system that was designed in an era of each part being supplied by a single preferred supplier?

In this white paper, we look at possible solutions to this mayhem, and how to eliminate possible sources of mistake.

Solving the Problem

The first line of defense is to use internal part numbers that are different from your supplier part numbers. If you have been using manufacturer part numbers, then prefix them with a letter to make them different – such as XWD30BL

Then, if you have a material tracking system like BellHawk, you can enter the translations between the supplier part numbers and the internal part numbers, including quantity translation, such as a TDisco WX324 = 10 XWD30BL. Where appropriate this translation can include the manufacturer and manufacturer's part number, if they are different from the supplier/distributor.

This will enable the materials tracking system to issue Purchase Orders with both Supplier and Internal Part Numbers and quantities.

When the materials are received then they are received in terms of internal part numbers, with automatic translation from external part numbers and quantities. Also, if needed, the supplier PO quantities and part numbers can be relayed to the accounts payable system for payment, as these are what are typically used as the primary part numbers and quantities on the PO.

When a box of parts is received from a supplier, a barcode label, with a tracking barcode, the internal part number and description, should be printed out and attached to each box so as to make it easy to identify.

Bills of Materials (BOMs) for making a product, a construction project, or making up a kit in a distribution warehouse will be in terms of the internal part numbers. Where identical parts are being purchased from multiple suppliers then the BOM will directly refer to the internal part

number. But it may refer to a specific revision of a part number, as in XWD30BL>2. This specific revision may refer to a supplier's part that is different from the "base" part and must be used as a replacement, in a specific BOM.

Thus, a TDisco WX324 will be mapped to a XWD30BL>2. If the BOM just calls for the base part XWD30BL then it will be at the discretion of the manager as to whether this is an appropriate substitute. But if a specific revision is called out, then only that revision from that supplier/manufacturers can be used.

This is a little complicated but enables the tracking system to warn material handlers if they are picking a wrong part or revision in a multi-supplier world.

A similar process applies to quotes, which may be done in terms of internal part numbers or may call out parts from specific suppliers. These specific supplier or manufacturer parts must then be used, installed, and/or shipped unless a waiver is obtained from the customer.

Inventory Complexity

When we look at inventory, we typically do so in terms of base part numbers. But this many be misleading as not all parts from all suppliers are identical. Thus, classical MRP systems which work in terms of base part numbers many not be appropriate.

Instead, we need to use materials planning algorithms which examine the requirements for each new job, determine what materials need to be purchased from which supplier, as well as what parts need to be made, installed, or shipped specifically for that job. These pull-based inventory management (PBIM) algorithms, such as used by BellHawk, determine materials purchases, as well as what to make and ship, incrementally as new Jobs arrive. This is very different from classical MRP systems which are embedded in ERP systems.

Because parts with the same base part number may not be interchangeable, it is important to use container-based tracking, such as is used by BellHawk, in which each box or individual item is tracked individually. This enable the system to determine how many of each revision from each supplier is in stock and to make sure that the correct parts are used for each job.

What about parts arriving on the dock with no paperwork? The answer is to simply receive the containers of material and assign a base part and new revision number. Then sort out all the paperwork later, as these may be critically needed for a job in progress.

Commentary

The changes in our supply chains have turned many of our prior practices in manufacturing, distribution and construction on their head. Nowhere is this more keenly felt than in handling the explosion of part numbers, which is happening as existing suppliers fail to deliver, and new suppliers emerge. But, with a system such as BellHawk, these changes are manageable even if they do result in more complex practices and procedures.

Finally, my apologies if all the different numbers for the same part make the above description somewhat confusing. But imagine how it can confuse a material handler who must deal with hundreds of such parts during the day.

Author

This white paper was written by Dr. Peter Green, who serves as the Technical Director of KnarrTek Inc. Dr Green obtained his BSC (Hons) in Electrical Engineering and his Ph.D. Degrees in Electronics and Computer Science from Leeds University in England. Subsequently Dr. Green was a senior member of technical staff at Massachusetts Institute of Technology and a Professor of Computer Engineering at Worcester Polytechnic Institute.

Dr Green is a Systems Architect who is an expert in using real-time artificial intelligence methods to implement real-time Inventory Tracking and Operations Management systems for Industrial Organizations. He has led the implementation of over 100 such systems over the past decade. Dr Green also led the team which developed the BellHawk job and materials tracking software and MilramX intelligent information integration software platform.

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