



Perennial ERP Manufacturing

Software that helps Production Managers

Plan their production activities and coordinate the supply of parts and labour with the production schedule so that manufactured products are always ready in time for delivery to your customers



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**WELCOME TO PERENNIAL ERP MANUFACTURING
FOR SMALL TO MEDIUM-SIZED MANUFACTURERS**

We trust that this Product Overview will demonstrate to you how Perennial ERP can help you plan your production and coordinate the supply of parts and labour with the production schedule, so that manufactured products are always ready in time for delivery to your customers.

Please feel free to reprint and redistribute this Product Overview to anyone you think may be interested in learning about the functionality contained in Perennial ERP.

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PERENNIAL ERP MANUFACTURING

TABLE OF CONTENTS

THE BATTLE TO COORDINATE PRODUCTION WITH DEMAND 1

WHAT IS PERENNIAL ERP?3

MAXIMISING PROFITS AND BUILDING CUSTOMERS FOR LIFE4

The Manufacturing Strategy.....5

Keeping It Simple6

SETUP FOR PRODUCTION PLANNING AND CONTROL8

Products and Parts8

Stock Items10

Manufactured Products11

THE PRODUCTION PLANNING PROCESS.....22

Demand Forecasting.....22

Production Scheduling24

Rough-Cut Capacity Planning26

Material Requirements Planning28

PRODUCTION CONTROL.....31

Generating Purchase Orders31

Generating Production Orders31

Receive Stock On Production Order33

Quality Assurance Testing.....33

Production Cycle Completed34

WHY CHOOSE PERENNIAL ERP?35

ABOUT PERENNIAL SOFTWARE PTY LTD37

HOW TO CONTACT US39

APPENDIX 1 – Shop Floor Control – Computers or People?40

THE BATTLE TO COORDINATE PRODUCTION WITH DEMAND

In today's highly competitive manufacturing industry, managers of small to medium-sized manufacturing companies are battling to coordinate the supply of the products they make with demand from their customers, and to do so productively.

After listening to our clients over many years and collating feedback from a variety of sources it's not hard to identify that many manufacturers are desperate for better ways to solve the problems they face each day.

Companies are struggling to manage cash flow as they carry excessive stock, sometimes up to 50% of annual sales revenue, to satisfy customer demand. Coupled with inefficient production, the cost of producing the end product yields too little profit.

Lack of planning and control over what parts are needed and when for production is further compounded by staff using the company system their way instead of the right way. Endless stock-takes are required to stay on top of stock control.

Many companies are struggling with mediocre reports that tell them some information, but not the really critical stuff that would help them make the right decisions faster as to the status of their supply, production and delivery deadlines.

More often than not, bills of materials and product costs are kept in spreadsheets, or even in the production manager's head, rather than in a secure centralised system. Spreadsheets and separate databases are being used to control other functions such as serial number recording and quality assurance, functions that would be much more easily managed if they were a part of the centralised system.

A Mismatch Between The Functionality Required And The Systems Installed

Unfortunately most small to medium-sized manufacturers do not have the right systems in place to perform these functions. Either the manufacturing software they use does not suit the way they do things, or they do not have any manufacturing software at all.

Their current system, usually a loose collection of spreadsheets, is difficult to keep up to date with the latest changes in costs, stock balances, and sales, purchase and production orders. It is impossible for them to ever have anything better than a rough approximation of what stock they have, what they need to purchase, what they need to produce, and what it all costs.

Their production schedule is in many cases based on experience, not on a managed plan based on current stock balances, forecast demand, and customer backorders. It is impossible to check available labour and machine capacity quickly, or to produce a report of what parts are needed and when.

When looking for new manufacturing software to help them manage their production, the usual complaint is that they don't understand it and that it looks far too complicated for them to use. Many are challenged, as they do not understand the jargon used by the software companies, who talk about "planned order releases" and "infinite work centre loading" and the "theory of constraints". The complexity of the software and the jargon used is a nightmare for most people to get their head around, an issue that is notorious in the software industry.

And the final turn-off is that the price of software and the related services to implement it is far too expensive and simply out of financial reach.

Finally, An Affordable Integrated Solution For Your Business Is Now Available

After more than 20 years working alongside small and medium size enterprises (SME's) in both chartered accounting, business consulting and systems support, John Nankervis, the founder of Perennial Software, has observed at first-hand the problems that SME's have to contend with, and how they want them solved.

Manufacturers are looking for a software solution that does more than just the mundane and straight-forward tasks. They want a system that can easily track a customer's order in the factory to keep tabs on whether it will be completed in time for delivery. They want to plan what they need to produce and when over the next 5 to 10 weeks. They want to know how much labour they are going to need to meet their production deadlines, particular in busy times.

They want an accurate costing of each end product that they make. They want to know how much stock they need to hold, for both end products and raw materials. They want to run their factory without bottlenecks, and without waiting for raw materials or component parts to become available. And they want a solution that does not use jargon that they do not understand.

Perennial Software has demystified the complexity with Perennial ERP. We have developed an easy-to-understand and easy-to-use software and services solution that provides small to medium-sized manufacturers with what they want at a price that they can afford.

Don't Take Our Word For It - Listen To What Our Clients Have To Say

In a recent independent survey, our clients gave Perennial ERP a rating of 4.7 out of 5 for our pricing, and 100% of the managers at our clients said that if they had their time over again, they would still choose Perennial ERP, and that they would recommend Perennial ERP to others.

And the main reasons our clients chose Perennial ERP in the first place?

Functionality and Price - Perennial ERP contains the functionality required at a much lower price than competitive software products. To make it even easier, we now offer a Pay-by-the-Month Subscription as an alternative to the traditional upfront licence fee.

Flexibility - Perennial ERP can be modified to suit specific requirements without degrading the client's right to software upgrades.

All-in-One - Perennial ERP contains modules for Manufacturing, Wholesale, Retail and Financial Control all in the same integrated software product.

Robustness for Data Integrity - Perennial ERP's Progress-based database provides the robustness required for SME's running mission critical applications.

Most importantly, Perennial ERP has been developed from the ground up for small to medium-sized enterprises (SME's), companies that employ from around 20 to 100 people, and is available at an affordable price for such companies. No longer are SME's locked out of the software functionality that they need just because it is far too complex for their requirements or far too expensive for their budget.

Discover How Perennial ERP Can Help You Dramatically Improve Your Business

Take the first to explore Perennial ERP for yourself and see how it can help your business outperform your competitors and build customers for life by having the right products in the right quantities in the right place at the right time.

Call Perennial Software Pty Ltd on (03) 9243 5678 or email us at info@perennial.com.au for a **free no-obligation analysis of your business requirements** to find out whether Perennial ERP is the right fit for your business.

In the meantime, we invite you to explore the functionality of Perennial ERP as explained in this Product Overview.

WHAT IS PERENNIAL ERP?

Perennial ERP is an integrated Manufacturing, Wholesale Distribution, Retail Point-of-Sale and Accounting system that has been developed from the ground up for small to medium-sized enterprises (SME's). Perennial Software, the creator of Perennial ERP, has implemented and supported systems for small to medium-sized enterprises for over 20 years. We understand the problems that SME's confront day in day out in trying to service their customers as best they can. So we developed Perennial ERP to help you run your business to achieve the most important objective of all - to serve your customers better than your competitors and thereby grow your business profitably.

Perennial ERP consists of the following modules:

Sales

Sales Order Management
Export Sales
Sales Analysis
Retail Point-of-Sale

Purchasing

Purchase Order Management
Import Costing
Purchasing Analysis

Inventory Management

Stock Control
Multi-Warehousing
Serial Number Tracking

Manufactured Products

Bills of Materials
Operations and Routings
Product Costings

Production Planning

Master Production Scheduling
Rough-Cut Capacity Planning
Requirements Planning

Production Activity Control

Purchase and Production Ordering
Stock Receipting and Back-Flushing Material
Quality Assurance

Accounting

Accounts Payable
Accounts Receivable
Cash Book
Fixed Assets
General Ledger

System Administration

Multiple Companies
Multiple Divisions
Multiple Departments
User Group Menu Security
Auditing

Perennial ERP has been developed using Progress Software's OpenEdge Application Development System. Data is stored in a Progress database, and front-end programs that users interact with when entering transactions, performing screen enquiries, and running reports can be developed using the Progress OpenEdge programming language, or other well-known languages such as Java.

Best of Breed Third-Party Software Products

Perennial ERP integrates with the following third-party Best of Breed Products that add value to the core modules outlined above:

Tableau Desktop – Customised Report Writing, Data Analytics and Business Intelligence

Microsoft Excel – A print option for many of Perennial ERP's reports allows for data in the Perennial ERP database to be sent to Excel spreadsheets for "what if" analysis and customised reporting.

Payroll Systems – Payroll summaries from third-party payroll software can be imported into Perennial ERP's General Ledger as an unposted general ledger journal.

This Product Overview focuses on how Perennial ERP helps a company schedule its Production and its Material Requirements, and control its Production Activities.

MAXIMISING PROFITS AND BUILDING CUSTOMERS FOR LIFE

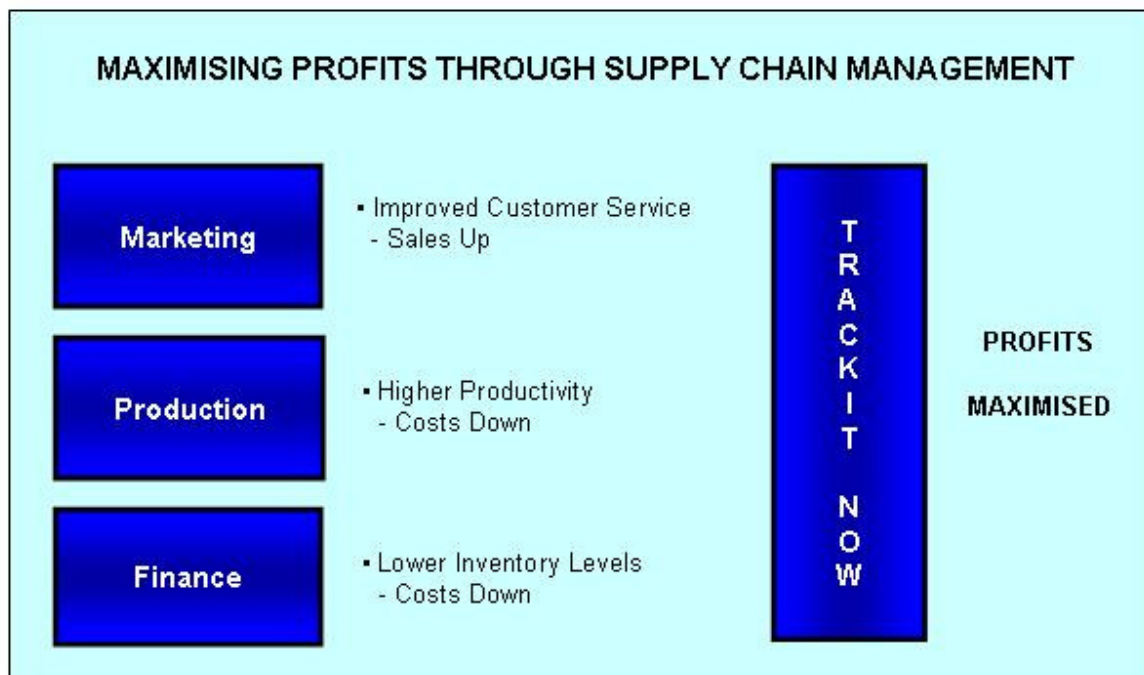
The key business value that Perennial ERP offers small and medium-sized manufacturers is that it helps them maximise their profits and build customers for life by having the right products in the right quantities in the right place at the right time.

Perennial ERP helps manufacturing companies manage their supply chain to achieve three key objectives:

- Improved customer service by increasing Deliveries In Full and On Time (DIFOT) and reducing time to delivery;
- Higher productivity levels by coordinating production runs with customer demand, supply of materials, and available production capacity;
- Lower levels of raw materials, component parts and finished goods inventory.

Sales are increased because customers that have experienced a high level of customer service will keep coming back for more instead of moving away to a competitor. New customers will be won because your company will develop a reputation for providing customers with what they want when they want it.

Costs are reduced through the increased productivity that results from a production schedule that is coordinated with available stock and labour capacity. Lower inventory levels result not only in reduced carrying costs but also in a boost to cash flow.



This Product Overview will explain how Perennial ERP's Production Planning and Control functionality helps production managers coordinate production with demand so that customer sales orders are fulfilled on full and on time every time, without having to carry excessive amounts of inventory.

PRODUCTION PLANNING AND CONTROL – STRATEGY AND SIMPLICITY

Perennial ERP Production Planning and Control provides the functionality required to help the production manager coordinate production with customer demand.

Production Planning provides the tools to help companies plan their production and their material requirements up to 10 weeks in advance, based on sales forecasts for finished products, on sales backorders, or a combination of both. It also involves

Production Control is about helping companies monitor their production activities to ensure that production orders are completed in full and on time. In other words, it is similar to monitoring if customer sales orders are being delivered in full and on time, and to monitoring if purchase orders placed on suppliers are being received in full and on time.

Before explaining the functionality of Perennial ERP Manufacturing and how a Small to Medium-sized Manufacturer (SMM) could benefit from using it to plan and control their production, two important issues need to be considered. First, the Manufacturing Strategy the software caters for and its compliance with the manufacturing strategy used by the SMM, and second, Keeping it Simple.

The Manufacturing Strategy

There are four recognised manufacturing strategies, so it is vitally important to ensure that the manufacturing software provides the functionality that is required by the manufacturing strategy that the SMM utilises. It also helps to reduce complexity if the manufacturing software is not an over-kill, by providing functionality for all four manufacturing strategies when only one or two are required.

The four recognized manufacturing environments are:

a. Make-to-Stock Manufacturing

The supplier manufactures the products and sells from finished goods stock. The products being manufactured are standard with no options and are usually inexpensive. Examples are manufacturers of small consumer items that are sold through supermarkets, such as dustpans, kitchen tidies, brushes, etc.

Perennial ERP caters for a make-to-stock strategy through a Master Production Schedule that schedules production of finished goods for stock based on forecasts of customer demand, reorder levels, and safety stock levels.

b. Assemble-to-Stock Manufacturing

The supplier assembles finished products from a stock of finished goods parts. This strategy is employed when the finished product is subject to a wide variety of product options, but can be assembled from a stock of standard components. A good example is a computer manufacturer, (e.g. Dell) which assembles the computer from a configuration specified by the customer.

An assemble-to-stock strategy requires a Final Assembly Schedule (as distinct from a Master Production Schedule) to assist in managing production. Perennial ERP does not yet cater for an assemble-to-order strategy, as a Final Assembly Schedule cannot be produced.

c. Make-to-Order Manufacturing

The supplier does not start to manufacture the finished product until an order is received from the customer. Such an order is created as a sales backorder, because the product ordered is not in stock. The finished product is usually made from standard parts with product options specified by the customer. In addition, the finished product may be too expensive an item to keep in stock. An example is a leisure boat manufacturer that makes boats from a standard range of boat designs, but offers options such as motor, colour, and accessories.

Perennial ERP caters for a make-to-order strategy in that it allows for product options to be entered for a customer order, and in that customer backorders are included in the Master Production

Schedule, and thereafter are added to the production process to products being manufactured for finished goods stock.

d. Engineer-to-Order Manufacturing

The supplier does not start to manufacture the finished product until an order is received from the customer and the manufacturing process includes design of the product. The customer has substantial input into product design. Raw material parts are not purchased until the design process is complete. This manufacturing strategy requires creating, updating and monitoring jobs specifically for each customer order.

The product may be manufactured at a production plant (e.g. specialised machinery), or may be manufactured on-site (e.g. a house). Manufacturing of products on-site or of large and complex products that may take more than a year or two to manufacture (e.g. a submarine) is often referred to as Project Manufacturing.

Perennial ERP does not yet cater for an engineer-to-order strategy as it does not provide the ability to create and monitor jobs specifically for customer orders. Rather, Perennial ERP creates production orders for stock and specifically for customer backorders, and production process is managed by reference to the production orders created.

To summarise, Perennial ERP's Manufacturing system has been developed for use by make-to-stock and make-to-order manufacturers of a range of finished products with or without product options.

Keeping It Simple

The first issue that a small to medium-sized manufacturer should take into account when considering implementing a new manufacturing software system, especially for the first time, is the complexity of the software products being offered. Many ERP (Enterprise Resource Planning) systems are designed for the mid-market and for large corporates, so it has been difficult for them to reduce the complexity of those systems to a level that can be effectively implemented and used by small to medium-sized manufacturers.

Perennial Software has deliberately chosen to design Perennial ERP's Manufacturing system to be relatively simple to use for small to medium-sized manufacturers, but at the same time to include the functionality required of best practice manufacturing systems. To this end, we have based the design of our software upon the manufacturing concepts and techniques that are the subject of the training and education programs provided by the Australian chapter of the American Production and Inventory Control Society (APICS).

For example, Perennial ERP does not have Detailed Capacity Planning, which tries to plan and control the available capacity of the labour and machine resources of every individual factory worker and every individual machine used in production. Instead, we provide a Rough-Cut Capacity Plan, which assesses available capacity of labour and machine processes against production requirements on a week-by-week basis.

In another example, we have deliberately chosen to exclude Detailed Shop Floor Control out of our manufacturing software, simply because we are of the view that small to medium-sized manufacturers do not have the resources to implement and effectively use such a difficult component of a manufacturing system. Shop Floor Control is about providing information that tells production managers exactly how to run their production schedule down to miniscule scale. Perennial ERP provides a week-by-week production schedule, a week-by-week material requirements plan, and a week-by-week capacity plan that a production manager can use as a guide as to what needs to get done and when on the factory floor.

Since making this decision to ensure Perennial ERP is not too difficult for small to medium-sized manufacturers to use, we have discovered another very good reason to "keep it simple", and that is, that in the opinion of a recognised expert in the field of ERP systems, manufacturing does not need complex systems because "manufacturing is not really all that difficult".

This expert, Kevin Meyer, founder of www.superfactory.com, a website "dedicated to spreading manufacturing and enterprise excellence information with an aim to improve manufacturing efficiency and productivity worldwide", made 2 key points in an interview with IT Business Edge (see Appendix 1):

1. That provided the shop floor is not cluttered with excessive inventory, manufacturing is not really all that difficult. He says that a lot of complexities have been added by “having high levels of inventory and a lot of complex processes that don’t need to be complex”.
2. That the Toyota plant runs successfully because “they have ERP systems to manage the gross aspects of their plants, but not for running the nitty gritty down on the floor. You start looking at that and you realize that the shop floor management for the manufacturing process becomes fairly simple. They process it sequentially, very rapidly and get it out the door”.

This is the type of thinking that is behind Perennial Software’s decision to keep the functionality of Perennial ERP’s manufacturing software high-level and simple.

So let’s move on to what that functionality is. We will begin with an explanation of how Products and Parts, Stock Items, and Manufactured Products are set up in Perennial ERP.

SETUP FOR PRODUCTION PLANNING AND CONTROL

Products and Parts

In Perennial ERP, products and parts are kept at the company level, and stock items (sometimes known as (Stock Keeping Units – SKU's) are kept for each warehouse in the company.

The company-wide product record stores data that is relevant to products no matter which warehouse it is stocked at. This includes descriptions, product groups, GL (general ledger) groups, and up to 4 selling prices. Note that many variations of selling prices can be setup in Sales Order Management for different individual customers or customer groups. A sample Perennial ERP product screen is shown below:

This particular product is the common household Dustpan and Brush set. Some fields are left blank as they are not required for this product. It is a manufactured product – see the “Purchased/Made” field at the bottom right of the screen.

Products can be identified as manufactured or purchased products, and they can be further identified as a finished product or a part of another product. Therefore, valid combinations of products are:

Manufactured Finished Products
 Manufactured Component Parts

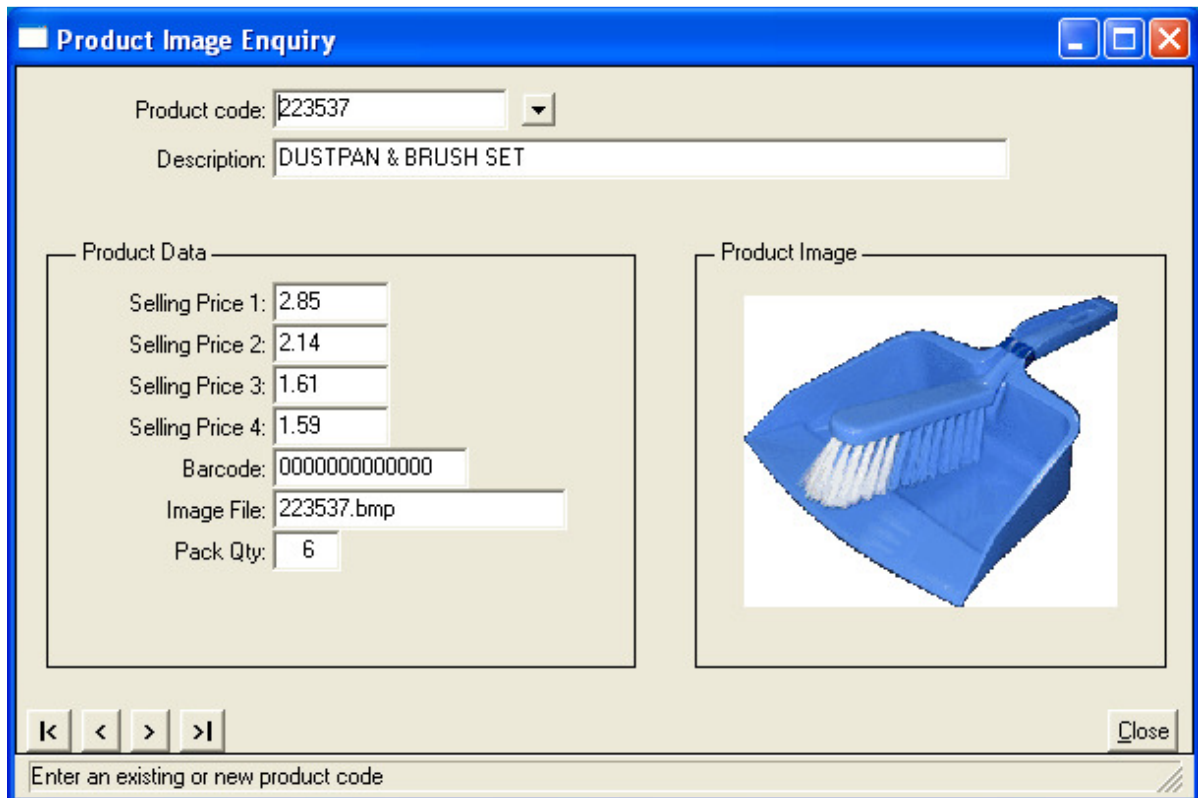
Purchased Finished Products for Resale
 Purchased Raw Material Parts

Note that products that are finished products in their own right can be included in a bill of material as a component part of another finished product. In this example, both the Dustpan and the Brush have their own product code and can be sold as separate manufactured finished goods, as well as being sold together as a set. The reason for identifying some products as parts is to ensure that they cannot be selected when processing a sale.

Products can be flagged as requiring serial number recording. For serially numbered products, serial numbers must be entered when receiving the products into stock or issuing them out of stock.

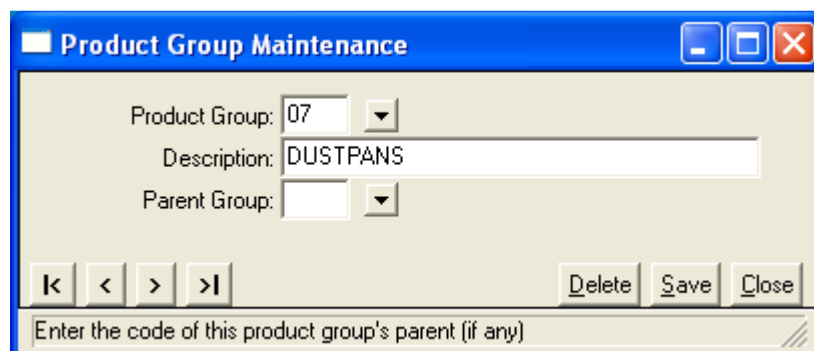
Product Images

Clicking on the image button in Product Maintenance displays an image of the product, as follows:



Product Groups

Perennial ERP has a one-level or two-level product group hierarchy. If a two-level hierarchy is required, parent product groups are created, and a product group is created as a child of a parent product group. In our example product, a one-level hierarchy is being used. The following screen shows how the product group for the dustpan and brush set has been created:



Stock Items

The warehouse-based Stock Item record stores data that is relevant to a product at a particular warehouse. A sample Perennial ERP stock item screen is shown below.

Stock Item Maintenance

Warehouse: VIC
 Product: 223537
 Description: DUSTPAN & BRUSH SET

Stocktake Cycle:	00	Qty On Shelf:	20,996.89
Primary Bin:	985C	Qty in QA:	0.00
Reserve Bin:	0	Qty Allocated:	20,996.89
Safety Stock:	1,000.00	Qty Free:	0.00
Demand During L/T:	2,000.00	Qty On Back Order:	24,185.11
Reorder Point:	3,000.00	Qty On P/order:	0.00
Supplier Minimum:	1.00	Qty In Production:	0.00
Reorder Quantity:	10,000.00	Qty In Transit:	0.00
Supplier Lead Time:	0		
Overseas Cost:	0.0000	Currency:	
Quoted Cost:	0.8600	Last Stocktake:	31/05/07
Standard Cost:	0.8621	Last Stock Count:	10,324.00
Last Cost:	0.8600	Computer Stock:	11,831.00
Average Cost:	0.8600	Accuracy %:	87.26

Navigation: [K] [<] [>] [>|] [Image] [Delete] [Save] [Close]

Enter data or press ESC to end.

This screen shows information relevant to purchasing and reordering the product for the VIC warehouse. We will explain how the quantities relating to reordering are used when we cover stock reorders in Purchasing and Manufacturing

Costs and quantities are maintained at the warehouse level. The last purchase cost and the weighted average cost are maintained by transactions processed in the system, primarily by the Purchasing system. The standard cost can be maintained manually, and can also be calculated and updated by the Manufacturing system.

Note that fields that cannot be maintained manually are disabled, and have a “duller” appearance than those that are enabled for update. Note also that stock items are created “on the fly” for the warehouse that the user is logged into when a new product is created, however, reorder quantities and costs still have to be updated manually where required.

Manufactured Products

The first step is to create bills of materials and routings (labour and machine operations assigned to a level in a bill of material). Individual bills of materials and routings are rolled up into fully costed Manufactured Products that are used as the basis for the production schedule, the rough-cut capacity plan, and the material requirements plan, so it is important to gain a thorough understanding of how manufactured products, bills of materials and routings are created and maintained. We will therefore explain this in some detail.

Creating a Manufactured Product

The product being used to explain how the product structure for a manufactured product is created in Perennial ERP is a household dustpan and brush set that you would buy at a supermarket.

The first step is to create this product as a Manufactured Product. This is done using the following screen:

Product:	223537	
Description:	DUSTPAN & BRUSH SET	
Lot Size:	10,000	Material Cost: 1.2265
Lead Time:	3	Labour Cost: 0.1969
Active Date:	22/10/04	Machine Cost: 0.1236
Expiry Date:		Setup Cost: 0.0027
Last Costed:	20/06/07	Overhead Cost: 0.3627
Waste Factor:	10.00	Waste Cost: 0.1227
Comments:		Unit Cost: 2.0351

Enter the usual production lot size for this product

The manufactured product must already exist on the Product file as a product that is made, as distinct from a product that is purchased. The lot size is the usual production run quantity and the lead time is the total time it takes to manufacture this product. Unit costs are summarised on the right-hand side of the screen. Changing the Waste Factor will update the Waste Cost and re-calculate the Unit Cost. All other costs are calculated and updated as explained in the next section.

How Perennial ERP Costs Manufactured Products

Each unit cost apart from waste cost is calculated from the multi-level bill of material and from the labour and machine processes that are required in the manufacture of the finished products.

In each bill, there will be a combination of purchased parts and manufactured parts, except for the lowest level, when there will be only purchased parts, the base raw materials for the manufactured product.

Material costs of both purchased and manufactured parts are the standard costs that are kept on the stock item record at the warehouse that is linked to the Manufacturing Plant. The screen shot further down this page shows Warehouse "VIC" is linked to Manufacturing Plant "VIC". This link is also used to update stock on hand when a production order is completed – more on that later.

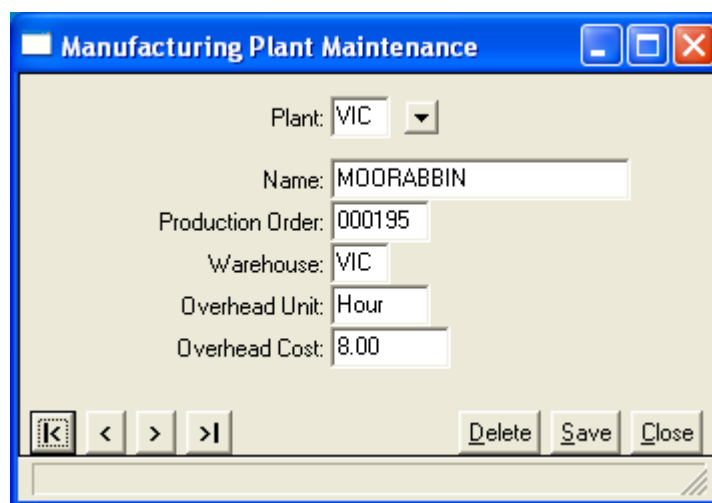
For purchased parts, standard costs are updated manually from time to time, usually every 3 to 6 months, after review against the actual supplier costs for the parts. For manufactured parts, standard costs are updated when a bill of material for the manufactured part is completed.

But how are the standard costs for manufactured parts updated, given that they are dependant on the bills of materials, and the material costs in the bills of materials are dependant on them?

The answer is that Perennial ERP has a powerful program, Manufactured Products Cost Update, that starts at the lowest level of a bill, updates the standard cost on the stock item record for the part being manufactured by that bill, then uses that standard cost as input to update the material cost of that manufactured part on the next level in the bill, and so on until the highest level, Level 0, is reached. Then it updates all the individual unit costs for the manufactured product, and stores the total unit cost as the standard cost on the stock item record for the manufactured product.

This program can be run whenever changes are made to material standard costs for purchased parts, or when labour, machine, setup or overhead costs, that are also maintained manually, require change.

The maintenance of labour, machine and setup costs is explained in the sections on creating and maintaining labour and machine processes. Maintaining the unit cost of fixed factory overheads begins with entering the manufacturing plant's total annual fixed overheads as an hourly rate on the Manufacturing Plant file, using the following screen.



The screenshot shows a software window titled "Manufacturing Plant Maintenance". The window contains the following fields and values:

- Plant: VIC
- Name: MOORABBIN
- Production Order: 000195
- Warehouse: VIC
- Overhead Unit: Hour
- Overhead Cost: 8.00

At the bottom of the window, there are navigation buttons (Home, Back, Forward, End) and action buttons (Delete, Save, Close).

In this example, fixed factory overheads for the year have been calculated at \$69,888. There are $24 \times 7 \times 52 = 8,736$ hours in a year, so the Over Head cost per hour is \$8.00 per hour. Some companies may prefer to use only working hours as the total number of hours in a year, but some fixed costs, such as depreciation and amortization of equipment will be incurred even whilst the factory is idle.

At present, Perennial ERP caters only for an overhead unit of an hour. Some companies calculate unit overhead cost based on the quantity of a common raw material used in the vast majority of products that are made by the plant. This method is currently under development.

A percentage of the unit overhead cost is applied to each machine process to cater for some machines incurring higher factory overhead costs than others (e.g. some machines use more electricity than others). The resultant cost is multiplied by the total of machine process time and setup time to arrive at an overhead cost per unit of manufactured part or product. An example of this calculation will be provided after we have explained how the bill of materials and labour and machine processes are created for a manufactured product.

The multi-level bill of materials for the manufactured dustpan and brush set is created as shown on the next page.

Creation of Bill for Manufactured Product 223537 – Level 0

Seq	Part	Description	Purchased or Made	Stock Unit	Quantity	Standard Cost	Extended Cost
1	1317	DUSTPAN SET CARTONS 25448-008	Purchased	EA	0.1667	0.3480	0.0580
2	408	DUSTPAN SET LABEL (LARGE)	Purchased	EA	1.0000	0.0185	0.0185
3	4456	BULK PACKED DUSTPAN (ONLY)	Made	EA	1.0000	0.1800	0.1800
4	4457	BULK PACKED VINYL BANISTER GBC	Made	EA	1.0000	0.4400	0.4400
5							

Each part (either purchased or manufactured) is assigned to the manufactured product code, together with quantities used in each individual unit of the manufactured product, and the cost of materials. The manufactured product is the top level of the bill (Level 0), and the parts assigned to it are at the next level of the bill (Level 1).

In this example, the purchased parts are 0.1667 x Cartons (6 to a carton) and 1 x Label. The manufactured parts are 1 x Dustpan and 1 x Banister (the brush). The presence of manufactured parts in this level of the bill indicates that this bill has another bill assigned to it, (a Level 1 bill). This is because a manufactured part has to be made from other purchased or manufactured parts. It is not until we reach a level of the bill where there are no manufactured parts and only purchased parts that we know we have reached the lowest level in the bill.

Creation of Bill for Manufactured Part 4457 – Level 1

Seq	Part	Description	Purchased or Made	Stock Unit	Quantity	Standard Cost	Extended Cost
1	023	4 1/8" BLACK PVC UNFLAGGED	Purchased	KG	0.0220	4.5200	0.0994
2	408A	DUSTPAN SET LABEL (SMALL)	Purchased	1	1.0000	0.0087	0.0087
3	47	BANISTER STOCK	Made	EA	1.0000	0.1800	0.1800
4							

This bill consists of 0.0220 kilograms of Black PVC (the brush fibre to be inserted into the banister), another (small) label for attaching to the banister, and 1 x Banister Stock, a manufactured part. Note that a manufactured part can also be a finished manufactured product in it own right.

14/09/2007 12:51
 User: Administrator

GENERAL BRUSHWARE PTY LTD

Co: GB
 Page: 1

COSTED BILL OF MATERIALS REPORT

Level	Part	Description	Stock Unit	Part Quantity	Extended Quantity	Unit Cost Of Part	Extended Cost Of Part	

PRODUCT GROUP: 07 DUSTPANS								

0	223537	DUSTPAN & BRUSH SET	EA					
_1	_317	DUSTPAN SET CARTONS 25448-008	EA	0.1667	0.1667	0.3480	0.0580	
_1	_408	DUSTPAN SET LABEL (LARGE)	EA	1.0000	1.0000	0.0185	0.0185	
_1	_4456	BULK PACKED DUSTPAN (ONLY)	EA	1.0000				
_2	_1005	POLYPROP GRANULES HOMOPOLYMER 2ND GRADE	KG	0.1140	0.1140	1.1000	0.1254	
_2	_1024	BLUE M/BATCH (TARGET) MB07064PP	KG	0.0023	0.0023	7.8000	0.0179	
_1	_4457	BULK PACKED VINYL BANISTER GBC	EA	1.0000				
_2	_023	4 1/8" BLACK PVC UNFLAGGED	KG	0.0220	0.0220	4.5200	0.0994	
_2	_408A	DUSTPAN SET LABEL (SMALL)	EA	1.0000	1.0000	0.0087	0.0087	
_2	_47	BANISTER STOCK	EA	1.0000				
_3	_1024	BLUE M/BATCH (TARGET) MB07064PP	KG	0.0013	0.0013	7.8000	0.0101	
_3	_1045	POLYPROP GRANULES HOMOPOLYMER 1ST GRADE	KG	0.0650	0.0650	1.3600	0.0884	
TOTAL UNIT COST OF MATERIALS FOR PRODUCT: 223537							-----	0.4265
							=====	

To complete the product structure for the manufactured product, the individual machine and labour processes required for the manufacture of the product need to be assigned to each level in the bill of material. To do this, the machine and labour processes, work centres in the factory, and operations (a collection of machine and labour processes performed in a work centre) have to be created. Then we can assign operations to each level in the bill. This assignment is known as a routing.

Creating a Machine Process

A machine process is created and maintained using the following screen.

Machine Code:	B04
Description:	Bristle banister brush
Cost Per Hour:	12.61
Overhead Rate:	3.00
Hours:	6.00
Machines:	4.00
Total capacity:	24.00

Navigation: [Back] [Previous] [Next] [Forward]

Actions: [Delete] [Save] [Close]

Status: The percentage of factory overheads to apply to this process

Note that a machine process is not an individual machine in the factory. It is the manufacturing process that can be performed on a machine or on a number of machines throughout the factory. Furthermore, an individual machine may be able to perform a number of different machine processes.

The above example shows that the machine process, to bristle banister brush (i.e. to insert brush fibre into a banister), can be performed on 2 different machines and that 6 hours per day are available for this process on each machine.

As mentioned earlier, Perennial ERP assigns factory overheads based on machine hours, so each machine process is allocated a percentage of a calculated factory overhead cost per hour (more on that later). Some machines may be assigned a higher percentage than others, perhaps, for example, because the machine that the process is performed on may take up more space on the factory floor or use more electricity than other machines. The total of overhead percentage rates allocated to all machine processes must equal 100%. This total is reported on in the Machine Process Listing for easy verification.

Allocation of factory overheads can vary widely from company to company, so it is possible that some modifications may need to be made if the company requires factory overheads to be allocated in a way not currently handled by Perennial ERP.

Creating a Labour Process

A labour process is created and maintained as follows:

Labour can be employed labour or contract labour, and the cost basis can be by time or by quantity (or piece) of component part made. Three shifts can be accommodated, and the capacity is calculated for each shift based on the number of employees in each shift multiplied by the number of hours worked in the shift. Capacity can also be calculated for overtime for each shift in the same way. In this example, only one shift is worked by 6 workers (one on each brush machine), which inserts the brush fibre into banisters, brooms, etc.

Creating a Work Centre

A work centre is created using the following screen:

The work centre is assigned a sequence in the factory and a lead time for manufacture to assist with scheduling of production orders. In this case, Moulding is the first work centre, and whilst the process of moulding the polypropylene into a plastic dustpan or banister does not take very long, the manufactured parts have to dry and harden overnight, so the total time in the Moulding work centre is 1 day.

Creating an Operation

A manufacturing operation can be now created as a combination of labour and machine performed in a work centre as follows:

This operation is to insert the fibre (“bristle”) into the banister and pack it into its own carton. The operation is performed in the Bristling work centre, and consists of a labour process to operate the brush machine, and a machine process to bristle banister brush. No setup labour is required for this operation.

The final step in creating a product structure is to assign the operation to a level of a bill. This assignment is called a routing, and is performed as follows:

Routing – Assigning an Operation to a Bill of Material

Manufactured Part 4457 is at Level 1 of the bill of material for manufactured product 223537. The base quantity of 250 is the quantity produced in the labour and machine time specified (in this case, one hour). This allows for the calculation of the Unit Labour Cost and the Unit Machine Cost as follows:

Unit Labour Cost

\$17.85 per hour for labour process BMO divided by 250 made per hour = \$ 0.0714.

Unit Machine Cost

\$12.61 per hour for machine process B04 divided by 250 made per hour = \$ 0.05044.

Unit Setup Cost

The unit setup cost is a once-off cost that is calculated for the production run quantity of the manufactured part, which, in this example, is Part 4457. It is calculated as follows:

\$17.85 per hour for setup process BMS multiplied by Setup Time 1.5000 hours = \$ 26.775.

\$ 26.775 divided by 10,000 production run quantity = \$ 0.0026775.

Unit Factory Overhead Cost

The unit factory overhead cost is calculated by multiplying the factory overhead cost per hour, which is manually calculated and entered for the manufacturing plant as explained earlier, by the total of the machine time and the setup time for the operation, and then by the percentage of factory overheads allocated to the machine process. The calculation is as follows:

Factory Overheads per hour = \$8.00.

Machine Time per unit produced = 1.000 hours divided by 250 per hour = 0.0040 hours.

Setup Time = 1.5000 hours.

Overhead Allocation to the machine process = 3%.

\$8.00 multiplied by (0.0040 + 1.500) multiplied by 3% = \$ 0.36096.

Costed Manufactured Products Report

We have now completed setting up the bills of materials and assigning labour and machine processes to them to create the complete product structures and costs for manufactured products and parts. An extract of the Costed Manufactured Products Report for Manufactured Product 223537 is shown on the next page. The above costs, rounded to 4 decimal places, are highlighted in bold.

The next step is to forecast customer demand for manufactured products.

14/09/2007 12:04
 User: Administrator

GENERAL BRUSHWARE PTY LTD

Co: GB
 Page: 1

COSTED MANUFACTURED PRODUCTS REPORT

PRODUCT GROUP: 07 DUSTPANS

MANUFACTURED PRODUCT: 223537 - DUSTPAN & BRUSH SET

OPERATIONS REQUIRED FOR: 223537

Operation 1 is 0020 - Attach wrapper & pack For Work Centre: P - PACKAGING

Labour Code	Labour Time	Labour Rate	Labour Cost	Machine Code	Machine Time	Machine Rate	Machine Cost	Setup Code	Setup Time	Setup Cost	Usual Run Qty	Setup Cost Per Unit	Overhead Cost	
AWP	0.0040	0.0000	0.0000	NONE	0.0040	0.0000	0.0000	NONE	0.0000	0.0000	10,000	0.0000	0.0000	
Cost of Operations:														0.0000

Level 1 PARTS REQUIRED FOR: 223537

Part Code	Description	Quantity	Unit Cost	Ext Cost
317	DUSTPAN SET CARTONS 25448-008	0.1667	0.3480	0.0580
408	DUSTPAN SET LABEL (LARGE)	1.0000	0.0185	0.0185
4456	BULK PACKED DUSTPAN (ONLY)	1.0000	0.1800	0.1800

OPERATIONS REQUIRED FOR: 4456

Operation 1 is 0520 - Mould Dustpan Components & Assemble For Work Centre: M - MOULDING

Labour Code	Labour Time	Labour Rate	Labour Cost	Machine Code	Machine Time	Machine Rate	Machine Cost	Setup Code	Setup Time	Setup Cost	Usual Run Qty	Setup Cost Per Unit	Overhead Cost	
MMO	0.0053	17.6800	0.0937	M01	0.0053	10.3000	0.0546	MMO	0.0000	0.0000	10,000	0.0000	0.0013	
Cost of Operations:														0.1496

Level 2 PARTS REQUIRED FOR: 4456

Part Code	Description	Quantity	Unit Cost	Ext Cost
1005	POLYPROP GRANULES HOMOPOLYMER 2ND GRADE	0.1140	1.1000	0.1254
1024	BLUE M/BATCH (TARGET) MB07064PP	0.0023	7.8000	0.0179
4457	BULK PACKED VINYL BANISTER GBC	1.0000	0.4400	0.4400

OPERATIONS REQUIRED FOR: 4457

Operation 1 is 0120 - Bristle banister stock & bulk pack For Work Centre: B - BRISTLING

Labour Code	Labour Time	Labour Rate	Labour Cost	Machine Code	Machine Time	Machine Rate	Machine Cost	Setup Code	Setup Time	Setup Cost	Usual Run Qty	Setup Cost Per Unit	Overhead Cost	
BMO	0.0040	17.8500	0.0714	B04	0.0040	12.6100	0.0504	BMS	1.5000	17.8500	10,000	0.0027	0.3610	
Cost of Operations:														0.4855

Level 2 PARTS REQUIRED FOR: 4457

Part Code	Description	Quantity	Unit Cost	Ext Cost
023	4 1/8" BLACK PVC UNFLAGGED	0.0220	4.5200	0.0994
408A	DUSTPAN SET LABEL (SMALL)	1.0000	0.0087	0.0087
47	BANISTER STOCK	1.0000	0.1800	0.1800

OPERATIONS REQUIRED FOR: 47

Operation 1 is 0490 - Mould Banister Brush Stock For Work Centre: M - MOULDING

Labour Code	Labour Time	Labour Rate	Labour Cost	Machine Code	Machine Time	Machine Rate	Machine Cost	Setup Code	Setup Time	Setup Cost	Usual Run Qty	Setup Cost Per Unit	Overhead Cost	
MMO	0.0018	17.6800	0.0318	M02	0.0018	10.3000	0.0185	MMO	0.0000	0.0000	10,000	0.0000	0.0004	
													Cost of Operations:	0.0508

Level 3 PARTS REQUIRED FOR: 47

Part Code	Description	Quantity	Unit Cost	Ext Cost	
1024	BLUE M/BATCH (TARGET) MB07064PP	0.0013	7.8000	0.0101	
1045	POLYPROP GRANULES HOMOPOLYMER 1ST GRADE	0.0650	1.3600	0.0884	
				Cost of Materials:	1.2265

UNIT COST BEFORE WASTAGE FACTOR: 1.9124

COST OF WASTAGE AT 10.00% OF MATERIAL COST 0.1227

TOTAL UNIT COST OF MANUFACTURE FOR PRODUCT: 223537 2.0351

Material Cost	Labour Cost	Machine Cost	Setup Cost	Overhead Cost	Waste Cost	Total Unit Cost
1.2265	0.1969	0.1236	0.0027	0.3627	0.1227	2.0351

THE PRODUCTION PLANNING PROCESS

The Production Planning process commences with forecasting customer demand.

Demand Forecasting

Demand forecasts are used by the Master Production Schedule to plan out production over the next 10 weeks. They are relevant primarily for a make-to-stock environment.

Customer demand for the company's products can be forecast for up to the next 12 months based on several factors, including past trends, on feedback from customers as to what they expect to order during the coming 12 months, and on the overall sales expectations of the company.

As a starting point, Perennial ERP allows Demand Forecasts to be automatically created from sales orders of the last year, including percentage increases or decreases and "rounding up" adjustments, using the following screen:

Generate Demand Forecasts from Sales Orders

Calendar Year: 2007

Week from: 1

to: 52

Product Group: *

Products from: First

to: Last

Percentage up/(down): 5%

Round up to: 10

OK Cancel

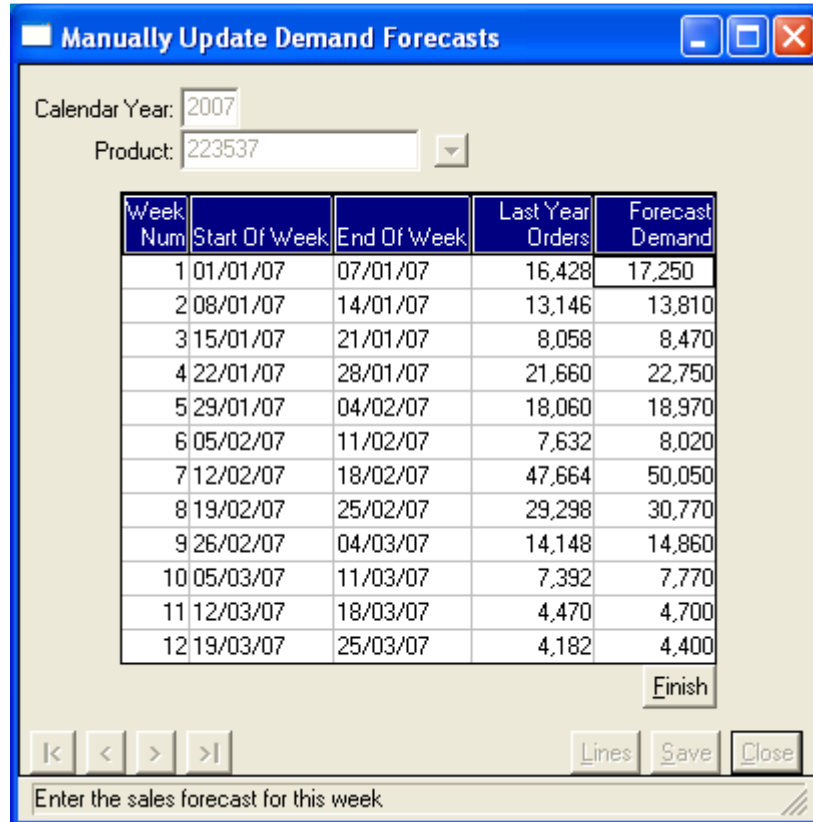
Enter the calendar year to update forecasts for

Production planning is performed on a weekly basis, so the demand forecasts are created for each week in the production calendar, which is created for each calendar year using another Perennial ERP program.

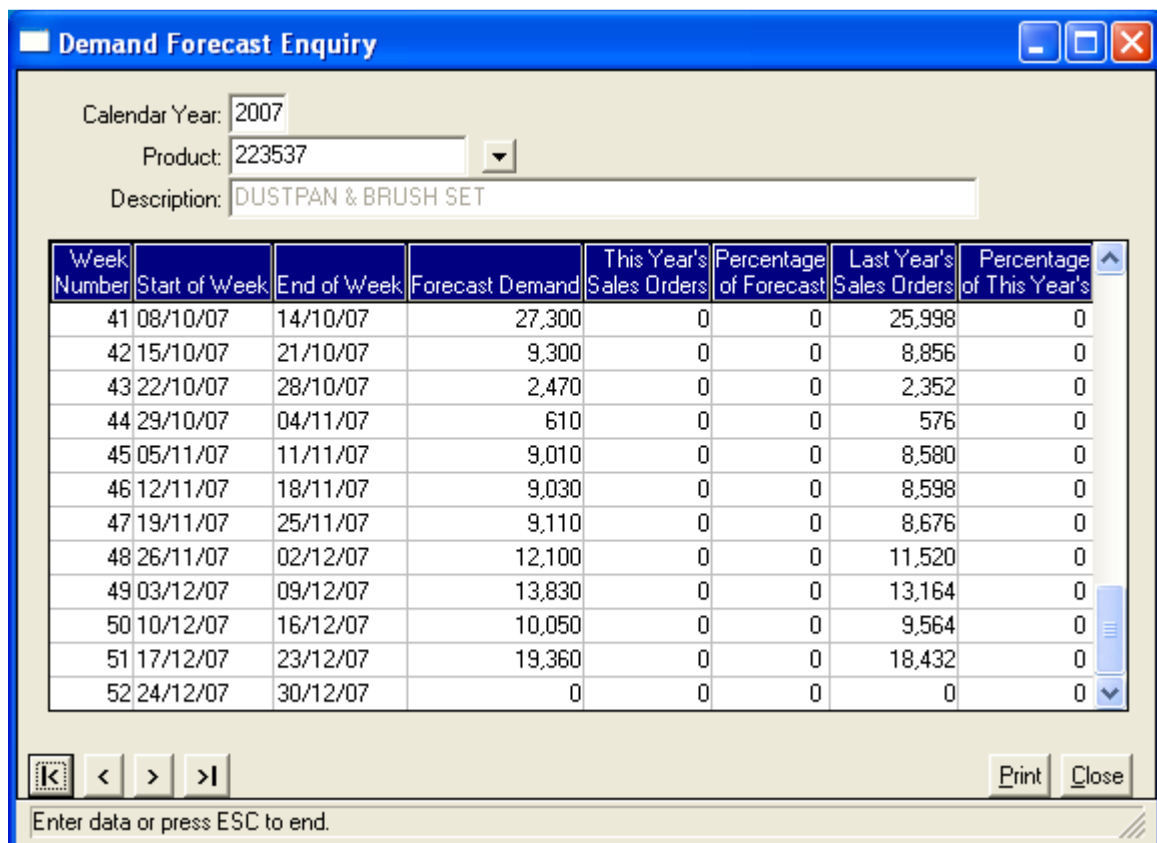
The above screen is generating forecasts for weeks 1 to 52 in 2007 from sales orders taken in 2006. It will generate the forecasts for all products in all product groups, and will add 5% on to the 2006 sales order quantities. Then it will round off the result to the next multiple of 10.

Alternatively, forecasts can be made using a spreadsheet or other forecasting tool. A program can easily be developed to automatically load those externally created forecasts into Perennial ERP.

Once created, demand forecasts can be updated manually using the following screen:



They can also be viewed and compared against actual sales orders so far this year and against last years sales orders, from which they may have been derived, using the following screen:



This enquiry shows, for example, that forecast demand in week 51 for product 223537 is 19,360 items, which is last year's actual sales orders for the same week plus 5% and rounded up to the next multiple of 10 ($18,432 * 1.05 = 19,354$, rounded up to 19,360).

This enquiry will also show actual sales orders for the forecast year as they occur, and compare them to the forecast demand to provide a running indication of how accurately the forecasts have been made.

Demand forecasts are not static. They can be reviewed and modified throughout the year to reflect changing market conditions and to correct inaccuracies in the original forecast.

Now we are ready to proceed to the next step, to generate a Master Production Schedule.

Production Scheduling

The Master Production Schedule (MPS) uses information from demand forecasts, sales backorders, and inventory management to schedule which finished products need to be produced to satisfy customer demand, when they need to be produced by, and in what quantities.

In Perennial ERP, you can run a Trial MPS to test whether your manufacturing plant has enough labour and machine capacity to meet the production requirements set out in the schedule. Amendments can be made to capacity or to the schedule itself, which can then be run again and re-tested until it passes the "capacity" test. Once it does, a Final MPS is run to confirm scheduled production for the next week, and to provide a guide for production planning thereafter.

This process is normally performed towards the end of each week to plan for production for the next week. It schedules production over 10 weekly time buckets to provide an outlook on production requirements over that time frame.

For a make-to-stock environment, the production schedule uses the demand forecasts for each product in each time bucket to determine what quantities need to be produced each week. It forecasts projected available stock at the end of each week, and uses that figure as the starting point for the following week.

Although the use of the production schedule is intended to avoid stockouts, they will nevertheless occur due to unexpected surges in demand, which will result in sales backorders that are due for delivery some time in the future. These sales backorders are in addition to forecast demand, so they are included in the production schedule as well as the demand forecasts.

An extract of the Trial Master Production Schedule is shown on the next page. It shows forecast demand each week for the next 10 weeks for product 223537, the Dustpan and Brush Set. It also takes into account a sales backorder due for delivery in Week 29.

The schedule also shows the stock available at the start of the production planning period, and the quantity to produce each week to keep projected available stock above the reorder level or "Order Point", in this example, 3,000. The quantity to produce is always a multiple of the "Lot Size".

Because the production lead time for the Dustpan and Brush Set is less than a week, production is scheduled in the same week that projected available stock is forecast to fall below the order point. If the lead time was longer than a week, production would be scheduled a week earlier.

21/06/07 12:30
 User: Administrator

GENERAL BRUSHWARE PTY LTD

Co: GB
 Page: 5

TRIAL MASTER PRODUCTION SCHEDULE

PRODUCT GROUPS/PRODUCTS	DUE FOR COMPLETION IN WEEK											
	AS AT	26	27	28	29	30	31	32	33	34	35	
	START	25/06/07	02/07/07	09/07/07	16/07/07	23/07/07	30/07/07	06/08/07	13/08/07	20/08/07	27/08/07	
223537 - DUSTPAN & BRUSH SET	Forecast Demand	9010	16250	19430	4540	50540	3250	13110	10200	2120	2100	
	Customer Orders:-											
	Order: 003094 Customer: MCDB Due: 20/07/07	0	0	0	1152	0	0	0	0	0	0	
	Quantity to Produce (Lot Size = 10000)	0	20000	20000	0	60000	0	20000	0	0	0	
	Order Point = 3000 Projected Available	19997	10987	14737	15307	9615	19075	15825	22715	12515	10395	8295
223537A - DUSTPAN & BANISTER SET(AHM)	Customer Orders:-											
	Order: 003437 Customer: AMEZ Due: 25/06/07	200	0	0	0	0	0	0	0	0	0	
	Quantity to Produce (Lot Size = 1000)	1000	0	0	0	0	0	0	0	0	0	
	Order Point = 0 Projected Available	0	800	800	800	800	800	800	800	800	800	
223537R - DUSTPAN & BRUSH SET REGRIND	Forecast Demand	0	7260	0	1270	0	0	0	4840	0	3630	
	Quantity to Produce (Lot Size = 3000)	0	6000	0	0	0	0	0	6000	0	3000	
	Order Point = 1 Projected Available	3504	3504	2244	2244	974	974	974	974	2134	2134	1504

Rough-Cut Capacity Planning

As mentioned earlier, the production schedule is first generated as a Trial MPS, which is measured against available labour and machine resources to ensure that the production levels specified in the Trial MPS can be achieved. The result is a Rough-Cut Capacity Profile, which is produced for the same time buckets as the Trial MPS.

The Rough-Cut Capacity Profile gets the information it needs to calculate available capacity from the routings for manufactured products and parts. Routings specify the labour and machine operations or processes required to produce a manufactured product or part, as previously explained.

Any significant capacity surpluses indicate that resources are not being used to the fullest, whilst deficits in available resources require the planner to review priorities and re-schedule production. Measures to balance required production capacity against available capacity include changing available capacity (e.g. work more overtime) or re-scheduling production (e.g. temporarily amend lot sizes).

Where significant surpluses or deficiencies occur, a Rough-Cut Capacity Detail can be produced for a specific labour or machine process to determine more precisely what products they occur for.

Quite often, there are two or three key labour processes which can be selected for resolution, and once resolved, will correct the surpluses or deficiencies in most of the other processes. In the sample data presented in the Perennial ERP database, there are two key processes, namely, operating the moulding machine to mould the polypropylene into plastic dustpans and banisters, and operating the brush machine to insert the brush fibre into the banisters (i.e. bristling).

Adjusting Labour Capacity

From the Rough Cut Capacity Detail, it can be seen that one of the key labour processes is to operate the brush machine. Changing available labour capacity of this particular labour process for the current production schedule can be performed using the following screen:

	Day Shift	Evening Shift	Night Shift
NORMAL TIME			
Workers:	15.00	0.00	0.00
Adjusted Workers:	15.00	0.00	0.00
Hours:	7.50	7.50	7.50
OVERTIME			
Workers:	0.00	0.00	0.00
Adjusted Workers:	0.00	0.00	0.00
Hours:	0.00	0.00	0.00
Adjusted Hours:	0.00	0.00	0.00
Shift Capacity:	112.50	0.00	0.00

Number of employees to work normal time in this shift

For normal time, the number of workers for the day shift is 15, but can be changed to another number if workers can be re-scheduled from other labour processes. For overtime, both the number of workers and hours can be changed. In times of excessive demand and severely limited capacity, additional shifts (Evening and Night) can be put on, with the same adjustment options as for the Day shift.

If the rough-cut capacity reports indicate that there is a deficiency in the available capacity for a particular machine process, increasing labour capacity by working overtime or putting another shift will also make more machine resources available.

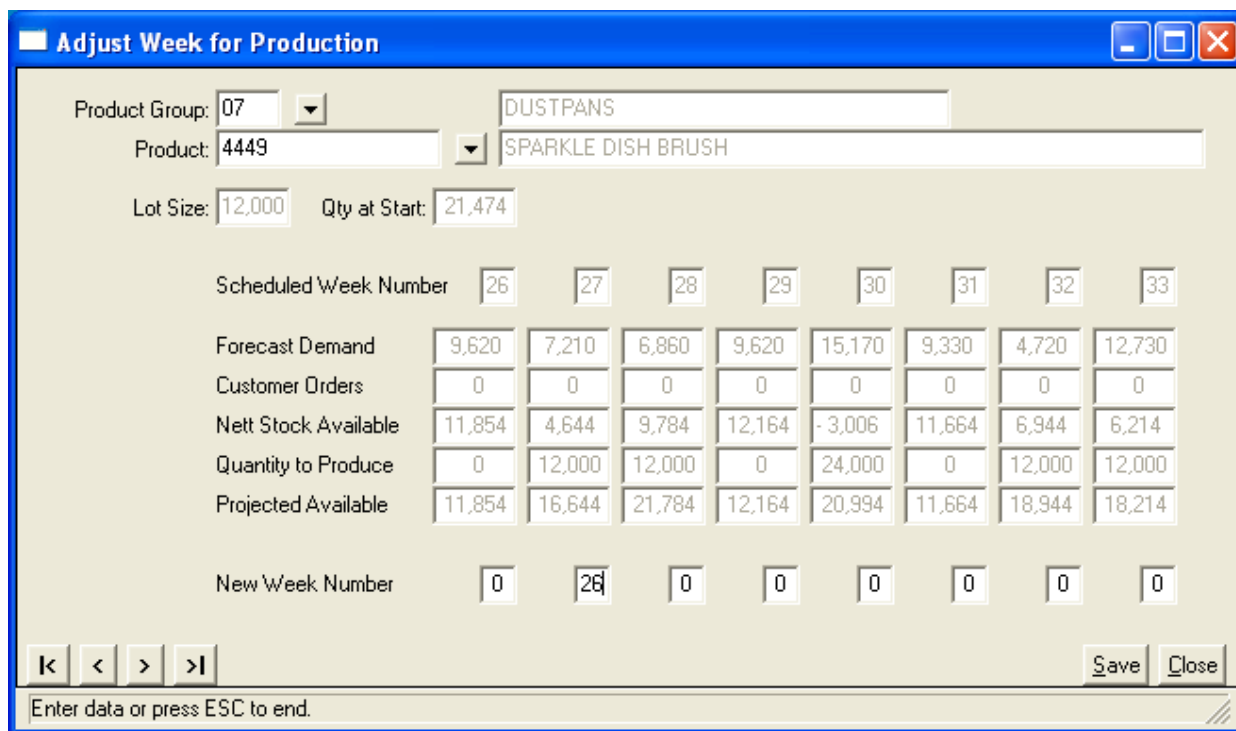
After these changes to capacity have been made, the Rough-Cut Capacity Profile can be re-run and more changes made until it is clear that there is sufficient capacity available to meet the production schedule.

This process can also be used to identify where there is excessive capacity, so that measures can be taken to make more efficient use of available capacity. These measures can include amendments to the production schedule to “use up” the surplus capacity, and this functionality is explained as follows.

Amending the Master Production Schedule

In order to resolve either deficient or surplus capacity issues that cannot be best resolved by changing available capacity, it is possible to amend the production schedule by changing the week in which a product is to be made.

The following screen will bring forward production of 12,000 units from week 27 to week 26, once the change is “Saved”.

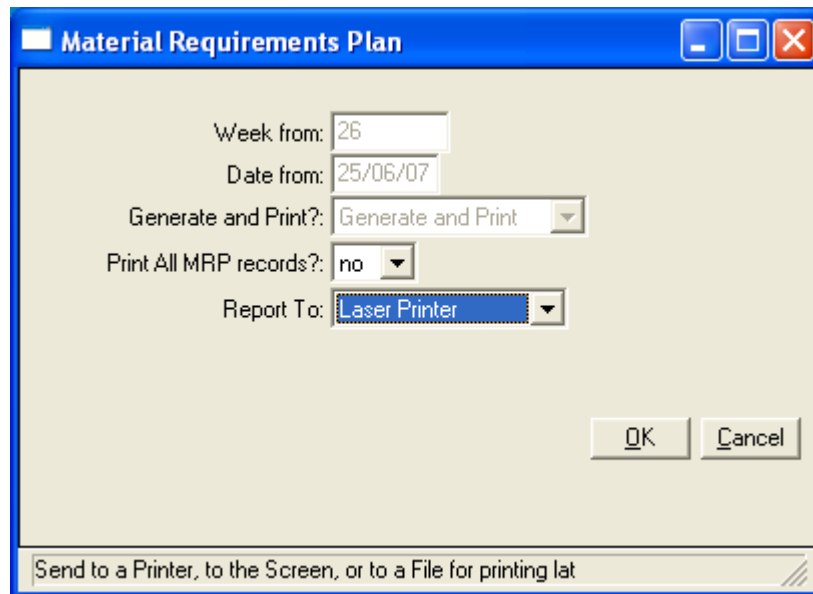


Scheduled Week Number	26	27	28	29	30	31	32	33
Forecast Demand	9,620	7,210	6,860	9,620	15,170	9,330	4,720	12,730
Customer Orders	0	0	0	0	0	0	0	0
Nett Stock Available	11,854	4,644	9,784	12,164	-3,006	11,664	6,944	6,214
Quantity to Produce	0	12,000	12,000	0	24,000	0	12,000	12,000
Projected Available	11,854	16,644	21,784	12,164	20,994	11,664	18,944	18,214
New Week Number	0	26	0	0	0	0	0	0

Once the changes have been made and capacity is being efficiently utilised, the next step is to check whether sufficient parts are available to meet the production schedule, and if not, when they should be re-ordered. This what the Material Requirements Plan does.

Material Requirements Planning

The Material Requirements Plan is produced for the same time buckets as the production schedule.



The screenshot shows a dialog box titled "Material Requirements Plan". It contains the following fields and controls:

- Week from: 26
- Date from: 25/06/07
- Generate and Print?: Generate and Print (dropdown menu)
- Print All MRP records?: no (dropdown menu)
- Report To: Laser Printer (dropdown menu)
- Buttons: OK, Cancel
- Footer: Send to a Printer, to the Screen, or to a File for printing lat

The MRP specifies the raw materials to be purchased and the parts to be manufactured to produce the finished products specified in the production schedule. It gets the information it needs from the bill of materials set up for each manufactured product and part. The bill of materials specifies the purchased and manufactured parts required to manufacture a product or another manufactured part.

The Perennial ERP MRP reports on five quantities:

1. Gross Requirements – the total quantity of the part required to meet the product schedule quantities of the manufactured products it is used in.
2. Scheduled Receipts – the quantities of the part not yet received on purchase orders and production orders already placed.
3. Planned Receipts – the quantities of the part that will be received on purchase orders or on production orders planned to be placed as a result of this MRP.
4. Projected Available Stock – a running balance of the projected available stock on hand of the part for use in production, after taking into account stock on hand at the start (shown under the "As At Start" column), gross requirements, scheduled receipts and planned receipts.
5. Planned Orders – The quantities of the part planned to be ordered on purchase orders or on production orders placed as a result of this MRP.

An extract of the MRP is shown on the next page. The first section of the plan shows parts that need to be purchased from external suppliers, whilst the second part shows parts that need to be manufactured as components for other manufactured parts or manufactured products. Both sections of the report take into account lead times for the supply of parts.

21/06/07 15:56
User: Administrator

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Co: GB
Page: 1

MATERIAL REQUIREMENTS PLAN

PRODUCT GROUP/PRODUCT

WEEK NUMBER

AS AT	26	27	28	29	30	31	32	33	34	35
START	25/06/07	02/07/07	09/07/07	16/07/07	23/07/07	30/07/07	06/08/07	13/08/07	20/08/07	27/08/07

PARTS TO PURCHASE

SUPPLIER: ACTION - ACTION MARKING PRODUCTS

396 - SOFTSWEEP WRAPPER (GREEN)

Gross Requirements		0	0	0	0	6,000	0	0	0	0	0
Scheduled Receipts		0	0	0	0	0	0	0	0	0	0
Planned Receipts (Minimum Qty = 1)		0	0	0	0	3,700	0	0	0	0	0
Projected Available Stock	2,300	2,300	2,300	2,300	2,300	0	0	0	0	0	0
Planned Orders (L/Time 14 days)		0	0	3,700	0	0	0	0	0	0	0

SUPPLIER: ALLI - ALLIED COLOR & CHEM P/L (G10)

1024 - BLUE M/BATCH (TARGET) MB07064PP

Gross Requirements	1	69	72	111	105	326	56	101	138	72	75
Scheduled Receipts		967	0	0	0	0	0	0	0	0	0
Planned Receipts (Minimum Qty = 1)		0	0	0	0	0	0	0	5	72	75
Projected Available Stock	7	904	832	721	616	290	234	133	0	0	0
Planned Orders (L/Time 5 days)		0	0	0	0	0	0	5	72	75	0

.

PARTS TO MANUFACTURE

PRODUCT GROUP: 04 - BANISTERS/CLAG/CAR

4457 - BULK PACKED VINYL BANISTER GBC

Gross Requirements	1,000	1,000	20,000	20,000	0	60,000	0	20,000	0	0	0
Scheduled Receipts		0	0	0	0	0	0	0	0	0	0
Planned Receipts		0	4,000	20,000	0	60,000	0	20,000	0	0	0
Projected Available Stock	18,000	16,000	0	0	0	0	0	0	0	0	0
Planned Orders (L/Time 0 days)		0	4,000	20,000	0	60,000	0	20,000	0	0	0

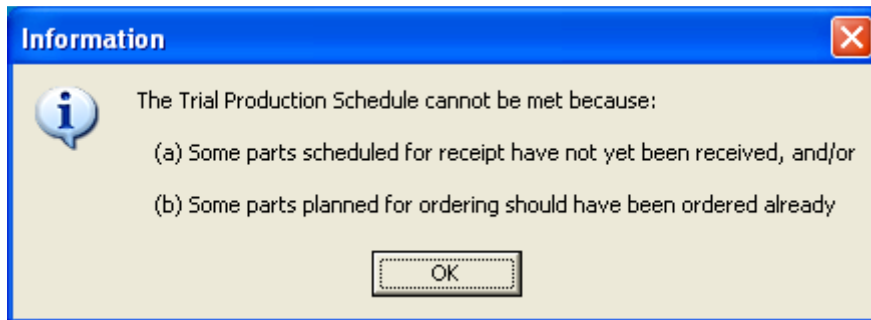
4457R - BULK PACKED VINYL BANISTER - REGRIND

Gross Requirements		0	6,000	0	0	0	0	0	6,000	0	3,000
Scheduled Receipts		0	0	0	0	0	0	0	0	0	0
Planned Receipts		0	5,284	0	0	0	0	0	6,000	0	3,000
Projected Available Stock	716	716	0	0	0	0	0	0	0	0	0
Planned Orders (L/Time 0 days)		0	5,284	0	0	0	0	0	6,000	0	3,000

When run for the first time, the MRP generates the MRP records from the Trial MPS. This allows the MRP to check the validity of the Trial MPS in two ways:

- a. That no outstanding purchase orders or production orders with a due date earlier than the first week of the production planning period still exist. Parts that have overdue orders will have a quantity against "Scheduled Receipts" in the "As At Start" column of the MRP. Whilst such orders should be monitored during the production process to ensure they are delivered on time, sometimes they are not, and production will be disrupted. But once again, this problem should hardly occur, and the way to resolve it is to change the due date of the overdue orders to a date after the start of the first week of the production schedule, and, of course, follow-up why the orders were received late.
- b. That no parts should have been ordered before the first week of the production planning period. Parts that have should already have been ordered will have a quantity against "Planned Orders" in the "As At Start" column of the MRP. This situation will normally only occur, if at all, when a company first starts using Perennial ERP Manufacturing system, and forecast demand has been set too early in the production schedule to provide enough time for the ordering and receipt of the required parts. It can be resolved by ascertaining which manufactured products the parts are used in (the Parts Where Used Report will provide this information), and then amending the Trial MPS to defer production in the first week that the manufactured products appear back to a later week.

If one or both of these situations occur, the following screen will appear after the MRP is run:



Once these issues have been resolved, the MRP can be re-generated to ensure the production schedule is valid (the above message should not appear), and the Trial MPS can be confirmed by running the Final MPS.

PRODUCTION CONTROL

The Production Planning process is now complete and purchase and production orders can be automatically generated from the Material Requirements Plan, and then controlled as to their fulfilment using the functionality provided by Perennial ERP.

Generating Purchase Orders

Purchase Orders raw material parts to be purchased from suppliers are generated from the Material Requirements Plan. If the “Parts To Purchase” section of the MRP shows a “Planned Order” for a part in the forthcoming week, then a purchase order will be created for it.

Once generated, they be reviewed and modified prior to being authorised (if necessary) and sent off to suppliers. Stock is updated to show that the required stock is now on purchase order.

The section on Purchase Order Management describes in full how purchase orders are handled in Perennial ERP, including enquiring on outstanding purchase orders, reporting on overdue purchase orders, and receiving parts on purchase order into stock as they arrive.

Generating Production Orders

Production orders specify the parts required, the labour and machine processes required, and instructions to be followed for the manufacture of a product or a part that is required for a product.

Production Orders for manufactured products are generated from the Final Master Production Schedule. If the schedule shows that a “Qty To Make” for a product in the forthcoming week, then a production order will be created for it.

Production Orders for manufactured parts are generated from the Material Requirements Plan. If the “Parts To Make” section of the MRP shows a “Planned Order” for a part in the forthcoming week, then a production order will be created for it.

A production order can be enquired upon by order number, by product code, or by work centre. In addition, a Production Orders Due Report can be produced to help manage production activity. The Production Order Enquiry by Production Order Number screen is shown as follows:

Production Order Enquiry by Order Number

Production Order:	000625	Description:	750mm PLATFORM BROOM STOCK		
Product:	750RV	Description:	BRISTLING		
Work Centre:	B				
Order Date:	20/06/07				
Date Required:	01/07/07	Qty Required:	10	Printed:	no
Date Completed:		Qty Made:	0	Finished:	no

Date Required	Manufactured Part	Short Description	Order #	Work Ctre	Description	Order Date	Qty Required	Qty Made	Date Completed
28/06/07	220	750mm PLATFORM STOC	000644	B	BRISTLING	20/06/07	10	0	

This screen shows that 10 of manufactured product "750RV", a platform broom, are to be "Bristled" in Work Centre "B" by 1st July, 2007 on production order 625.

It also shows that 10 of manufactured part "220", platform broom stock are needed as they are not in stock, and they are to be made on production order 644.

Sample production orders this product and part are shown as follows:

Production Order for a Manufactured Product

GENERAL BRUSHWARE PTY LTD
 PLANT VIC - MOORABBIN

Page: 1

**** PRODUCTION ORDER ****

ORDER NUMBER: 625

MANUFACTURED PRODUCT: 750RV - 750mm RED VINYL PLATFORM BROOM

QTY REQUIRED: 10

DATE ORDERED: 20/06/07

QTY MADE: _____

DATE REQUIRED: 01/07/07

OPERATIONS TO PERFORM -----	HRS:MINS -----
Sequence: 01	
Operation: Bristle platform broom stock and pack	
Setup Reqd: Produce platform brooms	40:00
Labour Reqd: Produce platform brooms	10:00
Machine Reqd: Bristle platform brooms	10:00

PURCHASED PARTS REQUIRED -----	QUANTITY -----
202 - 6" RED PVC GBC	5.67
337 - 900mm BROOM CARTONS VISY CODE T1050-4	5.00
421 - GBC LOGO LARGE	10.00
4412 - 25mm HANDLE FITTINGS NYLON	10.00
49 - SCREWS 3/4X8g ZIP CSK POZ1	40.00

MANUFACTURED PART REQUIRED -----	QUANTITY -----
220 - 750mm PLATFORM BROOM STOCK	10.00

Production Order for a Manufactured Part

GENERAL BRUSHWARE PTY LTD
 PLANT VIC - MOORABBIN

Page: 1

**** PRODUCTION ORDER ****

ORDER NUMBER: 644

MANUFACTURED PART: 220 - 750mm PLATFORM BROOM STOCK

QTY REQUIRED: 10

DATE ORDERED: 20/06/07

QTY MADE: _____

DATE REQUIRED: 28/06/07

OPERATIONS TO PERFORM -----	HRS:MINS -----
Sequence: 01	
Operation: Dock and corner platform broom stock	
Setup Reqd: Wood working/finishing	383:00
Labour Reqd: Wood working/finishing	10:00
Machine Reqd: Woodworking equipment	10:00

Sequence: 02	
Operation: Slot Platform Broom Stock	
Setup Reqd: Wood working/slotting	10:00
Labour Reqd: Wood working/slotting	10:00
Machine Reqd: Woodworking equipment	10:00

PURCHASED PARTS REQUIRED -----	QUANTITY -----
204 - PLATFORM BROOM TIMBER	7.50

Receive Stock On Production Order

When a production order is completed by the factory, it can be entered as such using the following screen:

The screenshot shows a dialog box titled "Receive Stock On Production Order". It contains the following fields and values:

Production Order:	000625
Order Date:	20/06/07
Date Required:	01/07/07
Product:	750RV
Qty Required:	10
Qty Made:	10
Date Completed:	20/06/07

Buttons: OK, Cancel, Close

Status bar: The quantity manufactured for this production order

This procedure increases stock on hand and stock in Quality Assurance (QA) and reduces stock on production order for the manufactured product or part. It does not increase stock free, as the stock is not available for sales until it has passed QA.

It also references the product structure in the bill of materials to reduce stock on hand of the purchased or manufactured parts used in completing the production order. This reduction is commonly referred to as back-flushing.

If the product is a serially-numbered item, a box will pop-up to allow serial numbers to be entered and recorded in the serial number file against the product, in the same way as is done when stock on a purchase order is received from external suppliers.

Quality Assurance Testing

Once a stock on a production order is received into stock, Quality Assurance testing of the products that have just been made can be performed before they become available for sale. Perennial ERP provides for the entry of Quality Assurance notes against a production order.

When the manufactured products or parts on a production order are received into stock, the production order is flagged as "Awaiting QA". If the products on the production order pass the QA testing, a QA note is entered against the production order, the production order is flagged as "Passed QA", stock free is increased and stock on QA is reduced.

If the products fail QA testing, a QA note is entered against the production order, the production order is flagged as "Failed QA", no stock updates occur, and the production order has to be reworked. Once the rework is complete, the products on the production order can be tested again, and another QA note can be entered, this time hopefully flagging the production order as "Passed QA", stock free is increased and stock on QA is reduced.

Please refer to the section of this report on Inventory Management for the Stock Balances Enquiry screen which show stock on hand, stock in QA, stock on production order, stock in QA, stock on hand and stock free.

The screen on the next page shows how QA notes can be entered against production orders. Note that multiple QA notes can be entered against a single production order.

Quality Assure a Production Order

Production Order: 000606 Production Order Date: 20/06/07
QA Date: 20/06/07
Time of Entry: 10:19:04
Product: 351BNC Short Description: 350mm BASSINE CANE Y
Qty Made: 100 Date Completed: 20/06/07
QA Status: Passed QA Entered By: Administrator

QA Note: Testing of 10 items randomly selected revealed no faults.

Navigation: |< < > >| Save Close

Enter data or press ESC to end.

The QA Note is an editor box which allows for free-format text entry and wrap-around of text at the end of each line. It contains 20 lines of up to 80 characters per line.

Production Cycle Completed

When the production order for a manufactured product has been entered as received and passed QA, the production cycle is complete, and the products on the production order are available to meet customer sales orders anticipated in the demand forecasts, and any sales backorders that may have arisen due to unexpected surges in demand.

WHY CHOOSE PERENNIAL ERP?

If you make, if you buy, if you sell, if you import, if you export, Perennial ERP is an ideal fit for small to medium-sized enterprises (SME's), organisations that employ from around 20 to 100 people.

Why?

Functionality That Will Help You Outperform Your Competitors

Perennial ERP provides you with the ideal level of functionality you require to run their business operations and to account for them. Perennial ERP helps our clients manage their operations through planning and control so that they are always able to supply their customers what they want when they want it, by having the right products in the right quantities in the right place at the right time.

Perennial ERP, a modern Windows-based application, has been designed from the ground up for SME's. It does not have the complexity of the larger systems that have been designed for the mid-market and for large corporations, nor is it a dumbed-down version of such a system. When designing Perennial ERP's functionality, it had to pass the test "Would the people working for an SME understand how to use this software?"

A Software and Services Solution

Perennial ERP contains the software tools you can use to manage your business, but also the complimentary services needed to help you get the best out of our software. We can draw on many years of experience to help you understand the relationship between what you do and how to get the benefits you want from using Perennial ERP. For example, you will probably want to use Perennial ERP to help you keep track of your stock, but if your stock is located in different areas of your warehouse that makes it difficult to count, you may not realise that benefit. Our services will help you avoid the "garbage-in garbage-out" syndrome that will kill off any benefits you are expecting from your system.

Best Value for Money Solution on the Market

Perennial ERP's pricing for both software licence fees and for related software services offers a solution that is both affordable and that represents the best value for money solution available in Australia. We can offer this pricing for 2 reasons:

1. We have developed Perennial ERP using Progress Software's OpenEdge, an application development system is known for fast application development, and that is ideally suited for applications developed for SME's.
2. We keep things lean and mean at Perennial ERP and focus on getting the job done for our clients. We do not have endless discussions on insignificant technical matters that provide little benefit to our clients or to the software that we develop.

One Integrated Application

Perennial ERP has been developed to provide the key business functions in one integrated application. It does not have "hooks" into other tightly-integrated applications that some other systems do.

A common example is Manufacturing, which requires real-time integration with the Inventory Management, Sales Order Management and Purchase Order Management modules. Some software vendors offer third-party Manufacturing software to make their ERP application complete, but this solution can often create more problems than it tries to solve.

Perennial ERP has all this functionality in one application developed by one company using one application development system where the data is stored in one robust database.

This aspect is very important for 3 reasons:

1. Our clients only have to deal with one organisation that takes full responsibility for the complete application.

2. Custom modifications made to the software to satisfy specific client requests are not at risk of being excluded in future upgrades.
3. Errors related to integrating data from multiple systems cannot happen.

Functionality Customised to Meet Your Specific Requirements

Perennial ERP provides levels of functionality that can be turned on or off depending on what features you wish to use.

Whilst Perennial ERP is delivered with a substantial amount of functionality that has been developed over a period of almost 15 years, SME's often require specific modifications to meet their "non-standard" requirements.

Specifically-requested modifications can be made to Perennial ERP without jeopardising the client's right to software upgrades under our Annual Maintenance program.

Multi-Skilled Software Development and Support Resources

Our software development and support partner, Linx IT Consultants, employs around 35 multi-skilled software analysts, programmers, testers, and implementation and training consultants that possess all the skills that could possibly be required to help you get the benefits you want from a new business system.

Implementation Guarantee

We at Perennial Software are fully aware that deciding on a new business software system for your company is a difficult decision to make.

Traditionally you have been required to make an investment of tens of thousands of dollars without really being able to assess the suitability of the software being proposed for your business. Our Implementation Guarantee provides you with the security of knowing that you will fully understand what our solution offers prior to making a purchasing commitment.

If, after completing the Training Sessions, you are not entirely confident that Perennial ERP's software functionality and the related services we provide will meet your business requirements as stated in the Sale Agreement, you do not have to proceed with the implementation of Perennial ERP, and we will refund your deposit for the Software Licence Fees in full.

Our guarantee goes hand in hand with our leading edge analysis and implementation process that provides you with every opportunity to ensure that you are making the right decision.

Our process allows you to experience Perennial ERP's software functionality the way you will want to use it in your business. You will also be able to judge the quality of our data conversion, training, and, if required, program modification services **before** making the final decision to proceed with the implementation of Perennial ERP for your business.

ABOUT PERENNIAL SOFTWARE PTY LTD

Creators of

Perennial ERP

Software that helps manufacturers, wholesalers and retailers build customers for life by having the right products in the right quantities in the right place at the right time.

Who Are We

Perennial Software Pty Ltd is a software solutions provider to small and medium-sized enterprises (SME's) that manufacture, wholesale, and retail. Our purpose is to help our clients improve their ability to service their customers by always having the right products in the right quantities in the right place at the right time.

What We Do

We provide software solutions that work for our clients, solutions that are founded upon **Perennial ERP**, a modern Windows-based enterprise software system that provides the accounting, sales, purchasing, inventory and production management functionality required by SME's. Perennial ERP contains the tracking mechanisms our clients need to maintain complete awareness and control over the state of customer orders, purchase orders, production orders, stock availability, and the accounting of every transaction processed through the system.

Multi-skilled Software Development and Implementation Team

Our partnership with Linx IT Consultants provides us with a substantial mix of software development and implementation resources to be able to deliver solutions that precisely meet any specific requirements of our clients that are not already satisfied by the functionality contained in Perennial ERP. We deliver these solutions without impairing the rights of our clients to future upgrades of Perennial ERP.

Our Background of Success

The origins for the development of Perennial ERP began in 1990, when Perennial purchased the rights to another Australian-developed software product called Pacific Software. During the 1990's, Perennial further developed and customised Pacific Software for use by almost 150 end-users spread over 18 SME's, ranging from 4 user sites to 30 user sites.

The Evolution of Our Software to Meet the Expanding Needs of Our Clients

Some of Perennial's clients expressed a need for a manufacturing system that integrated with their sales, purchasing, inventory management and accounting systems. In addition, Microsoft Windows, with its graphical user interface ("GUI"), was beginning to become the operating system of choice for SME's. So by 1999, a major project to develop a manufacturing module designed specifically for SME's and to re-develop the software for the Windows GUI environment was underway. Whilst the software's front-end (e.g. entering a sales order) had to be re-written to cater for the Windows GUI environment, much of the earlier version of the software could still be used as the basis for the background processing that occurs (e.g. updating stock balances) as a result of the user's input.

During this time, Perennial also took this opportunity to review and improve the programs that perform the background processing, including taking advantage of many new programming techniques that became available with each new version of Progress OpenEdge, the software development platform used by Perennial to develop Perennial ERP.

New Technology Delivering Highly-Valued Business Benefits

In November, 2005, Perennial commenced installing this new Windows version of its software at one of our long-time clients, an industrial supplies wholesaler with a total of 15 end-users.

After going live in March, 2006, the response from the client was that Perennial ERP was *"far, far better than the old system"*.

The new feature of the software that this client appreciated the most is the ability to process sales quotes, sales orders, sales invoices and purchase orders, all containing many product lines, in an updateable browser similar to a spreadsheet. This feature makes it very easy for the client find review and change anything they have already entered.

Not long after, Perennial won an important new client, a retailer of period-style furniture and lighting. This client also wholesale to other retailers in country areas and interstate. Most of the goods they sell are purchased either locally or from overseas (particularly China), but they also manufacture bathroom vanities and mantle-pieces for fireplaces.

For this client, the Point-of-Sale part of the application had to be developed into a more complete Retail application. This was a substantial development project which took several months to complete, and in March, 2006, Schots went live with up to 30 end-users.

After a particularly busy last weekend of June, 2006, when they had their annual sale, the response from the client was that they ***"did not have a single problem with the software. Our staff had no problems using it, and we are very happy with the way it stood up over the weekend."***

Independent Surveys Validate Perennial ERP's Success

In late 2006, Perennial engaged The Quantum Organisation to provide marketing and business development consulting. One of the tasks that Quantum carried out was to survey several of the key end-users using the new Windows version of the software, which by now had been brand-named as Perennial ERP.

The most significant result of this survey was that all of the key end-users surveyed stated that if they had their time over again, they would still choose Perennial as their business systems software and services provider.

Another key finding of the survey was that Perennial would need additional resources to grow. This finding confirmed a view that Perennial already held, and negotiations to form a partnership with one of Melbourne's largest private software development companies, Linx IT Consultants, came to fruition during 2007.

A Partnership to Serve Our Clients Better and Multiply Our Client Base

Linx will assist Perennial with implementing Perennial ERP at new clients that we are able to help. Linx employs around 35 software analysts, programmers, testers, and implementation and training consultants. Their major client is the Toll Transport Group, who they have been helping since 1999, so their expertise in developing and maintaining software solutions using the same software development platform (Progress OpenEdge) as Perennial has used will allow for substantial enhancements to Perennial ERP, with resultant benefits to our clients, in the coming years.

At all times, Perennial maintains a high-level project management role to ensure that the client is delivered with what we have promised. We engage Linx on behalf of our clients for software development, implementation and training services, but we will always retain the responsibility for ensuring that our clients get the solutions that they need to run their businesses better.

About John Nankervis - Founder of Perennial Software Pty Ltd

John Nankervis has gained extensive experience in selling, implementing and supporting business software applications to SME's (small to medium-sized enterprises) over a 20 year career in the software industry.

John spent the first 12 years of his career working with chartered accountancy firms, including Price Waterhouse and Pannell Kerr Forster. During this time, John qualified as a Chartered Accountant, a qualification he still holds today.

Since the mid-1980's, John has been recommending, selling, implementing and supporting business software solutions for a diverse range of SME's. He has successfully completed RMIT University's Master Of Business Administration Degree, and has completed four of the education courses in inventory and production management that are run by the Australian Chapter of the American Production and Inventory Control Society (APICS).

HOW TO CONTACT US

If you want to find out more about Perennial ERP, you can contact us either by mail, by email, or most easily, by telephone. Please address your enquiry to the attention of:

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APPENDIX 1 – Shop Floor Control – Computers or People?**Does My SMB Need ERP? Maybe Not.**

Source: [IT Business Edge](#) | Date Published: 19th July, 2007

With Kevin Meyer, [Evolving Excellence](#) blogger and [Superfactory.com](#) founder. In discussing the very serious thinking about simplicity that lies beneath the "Staples Suggestion," Meyer says SMBs are often better off reducing inventory and trusting their workers with more control over the production flow.

Question: You recommend small and medium-sized businesses be wary of ERP. What led you to take that stance?

Meyer: I have worked with a lot of big companies, and been involved with a couple of my own over the years. ... The concept that I have come to understand is that manufacturing is not really all that difficult. We add a lot of complexities by having high levels of inventory and a lot of complex processes that don't need to be complex. Very often, we're doing all this without using the knowledge of the workers on the floor.

Question: Anything particular in your work history that triggered that insight?

Meyer: I was touring a Toyota plant, for example, and there is no electronic control for the work processes, no computer dictating the work order, no routers or any of that type of thing. ... Instead, it was very visual and very intuitive. They have ERP programs to manage the gross aspects of their plants, but not for running the nitty gritty down on the floor. You start looking at that, and you realize that the shop floor management for the manufacturing process becomes fairly simple. They process it sequentially, very rapidly and get it out the door.

A lot of times, we complicate our processes by bringing in complex shop floor control systems, which small business owners feel they need because they see all this stuff all over the place on the shop floor. They feel they need to manage all that. But as you reduce your inventory and get some of that stuff off your floor, you have far less need for that.

Question: OK, say you streamline your processes and rush your inventory out the door. Who manages the work flow, if you aren't relying on an ERP system?

Meyer: Well, another bonus is that the operators on the shop floor actually take control. The operators take control over what they move, and they self-manage the go-to areas, where maybe some of the bottlenecks are occurring, rather than relying on a supervisor or lead.

Question: A lot of times, workers in a manufacturing environment feel like they are paid to focus on their particular role in the production line, and aren't asked to help manage the process. Isn't that the case?

Meyer: I think there are cultural aspects of that. The American model is a very directive-, top-down-driven business environment, in which manager tell supervisors what to do, and supervisors ride herd on a group of workers that sit at a bench and do what they are told.

You can see it even in the U.S. books that first came out about the Toyota manufacturing approach – they literally only told half the story. The whole Toyota approach really involved two fundamental aspects: waste removal and, just as importantly, implementing a respect for the people side of your business. The second part was simply left out of the books. There are very few U.S. companies that understand that second aspect. That is one of the reasons Toyota hasn't laid off since 1951, for example. Their approach is also about using the people to manage the production floor to improve the manufacturing process.

Question: So the business-school craze over Toyota's approach left out half the recipe for their success?

Meyer: The U.S. management approach took up just one of the pillars of manufacturing (from the Japanese), the waste removal, the idea of reducing inventories, for instance. But even many of the companies that really wanted to implement the Toyota approach simply didn't know about the other pillar, the other half of the equation. There are examples of this all over the place, where major U.S. companies adopted the Toyota approach and made huge investments in it. But they didn't focus on the people side; they continued (for example) to ship operations offshore, and lost the creativity and loyalty of a traditional,

empowered workforce.

Question: Is there something about our love for technology, or our fascination with the IT department perhaps, to make SMBs so eager to turn over control of their shop floor management to software? A reluctance to trust their workers?

Meyer: I would not blame it, per se, on anything particular to the tech world itself. I think there are a lot of reasons companies look for technology for shop floor management. It could be as simple as that, by not getting the waste out and reducing cycle times, managers see materials stacked everywhere and feel their only solution to get all that under control is a software solution. So with all the emphasis from SAP and Oracle on ERP products, you can get the message that you must have this software to be effective.