System Overview

Introduction (Seminar 2)

This is one of a series of Seminars which have been designed to supplement the ManuDyn Video Tutorials and other documentation provided as training aids for the System. The topics have been compiled following feedback from attendees at the various ManuDyn Training Seminars that have been held now for many years.

This Seminar is designed to provide a system overview in order to facilitate the development of an implementation plan. It is important to take time out to consider what the ManuDyn system actually is, what it does, and also how to go about getting the most out of your ManuDyn system, before committing too much effort to the hard work of data entry.

The ManuDyn software system is primarily concerned with getting control of the manufacturing process. The basis for the operation of the entire system revolves around the Manufactured Item (or Part), which is primarily a definition of what you make.

In ManuDyn:

> *A Part is a Manufactured Item and is something that you make.*

There are some other definitions that you will need to know before we proceed with the system overview.

Other Definitions

Some of the following definitions will be obvious. Nevertheless, they need to be documented in order to provide a complete list of definitions and to prevent the confusion of terms.

> *A Customer is a person or organization to whom you sell something.*

> *A Vendor (or Supplier) is a person or organization from whom you purchase something.*

To prevent confusion, we normally refer to "**you**", the ManuDyn user, as the Client.

> *A Material (or Stock) Item, in the first instance, is a raw material that is purchased.*

There is also a category of material items which are both Stock Items and Part Numbers. These are referred to as Stock/Parts and they represent finished goods that are manufactured by you. That is, you are the Supplier.

> *A Stock/Part is a manufactured item, held in Stock, where you are the Supplier.*

Next we have a couple of items called Quotes and Jobs. The last one representing Sales Orders in ManuDyn, that are received from your Customers.

> *A Quote is a quantity of a Part, for a Customer, at a price.*

> *A Job is a quantity of a Part, for a Customer, at a price, with a Due Date.*

Jobs are predominately orders for a Manufactured Items held (stored), on a Sales Order file. It should be noted that this is not always the case as Sales Orders can also be raised for non-manufactured items, that is purchased items.

The other terms used throughout the ManuDyn system are Invoice and Purchase Order. Although these should be obvious to you, it is worth taking the time to define them also.

> *An Invoice is the result of the "Supply" stage of a contract between you and the Customer. It details the amount your Customer has to pay for the goods you supplied.*

The Quote is the "Offer" stage of this contract and the order from your Customer, which results in a Job, is the "Acceptance" stage.

> *A Purchase Order represents the "Acceptance" stage of a contract between you and the Supplier. It confirms the price, quantity and delivery date in addition to the material or service required.*

I have phrased these terms in "legalese" to emphasize the dealings between you and your Customers and Suppliers represent legal contracts that once entered into will need to be fulfilled and/or otherwise finalized. Contracts, as you know, should not be undertaken without careful consideration.

Not everyone will agree with these definitions. I admit that the definitions may be incomplete, or that there may be other terms used by you (or others) to represent the same thing. Nevertheless, they are the definitions that are used throughout the documentation associated with the ManuDyn software package. If you do not wish to be confused, then I urge you to adopt the set of definitions listed above.

Now that things have been defined I can return to the main task of providing a complete system overview. Throughout the discussion that follows I will be referring to the schematic diagram in Figure 1 below.
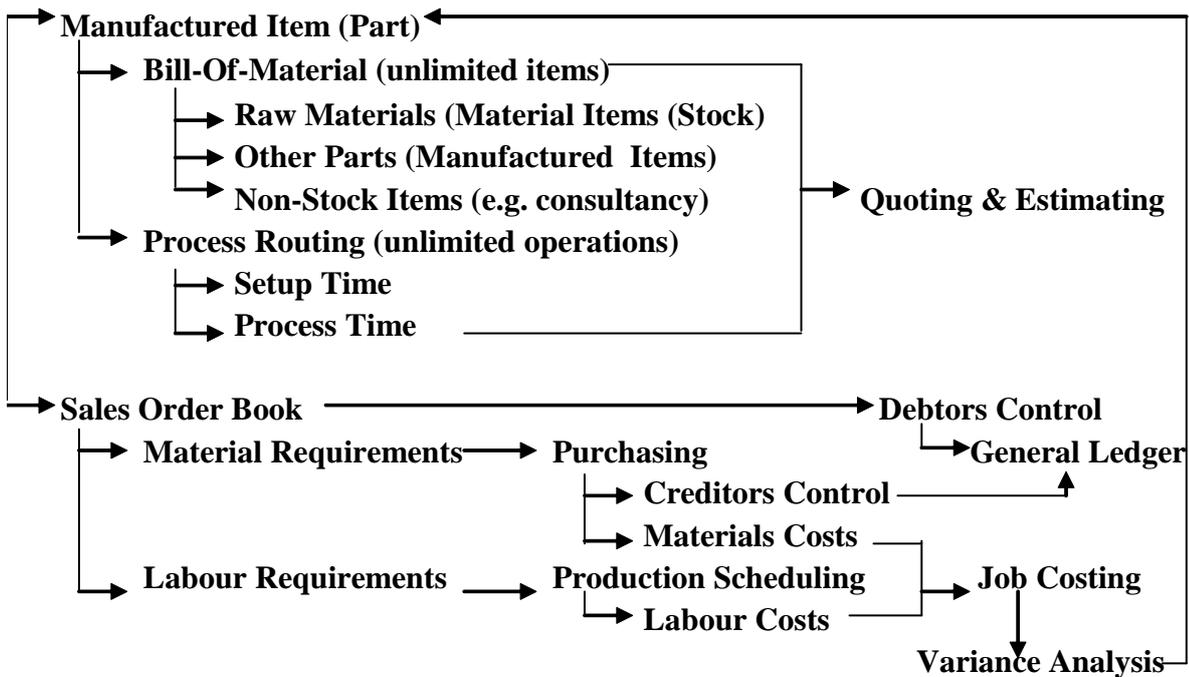
ManuDyn Overview

Manufactured Item (Part)
    Bill-Of-Material (unlimited items)
        Raw Materials (Material Items (Stock)
        Other Parts (Manufactured Items)
        Non-Stock Items (e.g. consultancy)   Quoting & Estimating
    Process Routing (unlimited operations)
        Setup Time
        Process Time

Sales Order Book   Debtors Control
    Material Requirements   Purchasing   General Ledger
               Creditors Control
               Materials Costs
    Labour Requirements   Production Scheduling   Job Costing
               Labour Costs
               Variance Analysis

Figure 1   ManuDyn System Overview

This diagram provides a useful summary of the operation of the ManuDyn system.

The Manufactured Item (or Part)

The first item listed in Figure 1 is the Manufactured Item (or Part) which, as we have seen above, is something that you manufacture. Now, in order to make something you first have to define the raw materials used in its manufacture and also the process operations that are required. The Part stored in the ManuDyn database therefore consists of the Labour and Material items necessary to make the item.

The list of materials required to manufacture a Part is called a Bill-Of-Material and the list of operations is called a Process Routing.

The ManuDyn Bill-Of-Materials (BOM) contains information concerning the *estimated quantity of each material required to make One Unit of the Part*.

The Process Routing defines the operations which are to be carried out and the *estimated time (broken down into setup and process time), required to make One Unit of the Part.*
With this information it should be clear that the Part forms the basis of the Estimating component of the ManuDyn Quoting & Estimating System.

To obtain the quote all that is required is to assign a cost to each of the materials, and a recovery rate to each process, and then provide a suitable set of markups to recover the overhead costs, and of course, make a profit.

The material cost is stored against each material item in the BOM. The recovery, rate for each operation, is defined through the system install routine *System Settings/Work Areas*, and is accessed from the Work Area selection.

Once the Quote is determined, the balance of the Quoting module is concerned with providing a facility to generate the Quote Advice, and also a tool keeping track of quotes through the Quote Follow up and Status reporting system.

The Quote represents the "Offer" stage of a potential contract between you and your Customer.

About 30% of the time the Quote will become an order (the "Acceptance" stage of the contract). In ManuDyn, orders are entered onto the Sale Order Book via the *Sales Orders/Order Management* menu item.

This section of the ManuDyn system provides a facility to process the customer's order and monitor its manufacture. The basic order processing facilities that constitute the Job-Shop Schedule are also in this module.

The functionality available includes Labour and Material Variance analysis and Job Cost analysis both of which result from the shop-floor data feedback facilities.

The Manufactured Item (Part) definition and the Sales Order "Book", provide a facility to determine the Material and Labour requirements for manufacturing. As detailed in Figure 1, the material requirements lead to Purchasing, and the labour requirements lead to Production Scheduling. These two areas represent the two major functional activities associated with your business operation.

The Accounts Receivable system finalizes the Sales Order, (by invoicing the Job), and then the invoice is finalizing through the Debtors system (by recording Customer Receipts) or via our third part links to an external accounting system for finalization.

The Accounts Payable system finalizes the Purchase Order. In the first instance by receiving goods against the Purchase Order and then reconciling the receipts against a Supplier Invoice. The Supplier Invoice is finalized by recording Payments or alternatively this can also be done via our third party Accounting Software links (such as the link to Quick Books Online).

In ManuDyn the Inventory control system can operate in both the make-to-order or make-to-stock modes by defining Re-order Points and Re-order quantities for the Material (and Manufactured) Items. Setting a Re-order quantity against an item effectively make the Item and "Inventory Item" whereby requirements are accumulated and orders (both Sales Orders and Purchase Orders) are raised in the *Inventory Control/Order Processing* menu item.

So far we have seen that defining the labour and material requirements obtained from the Manufactured Item and the Sales Order "Book", leads to activities such as Purchasing, Scheduling and Accounting control. These functional activities, however, are not what ManuDyn is primarily about.

The principle function of the ManuDyn system is to provide a tool for labour and material cost control.

To control costs you require accurate and timely information concerning the use of labour and material resources during the manufacturing process. Material costs are usually the easier of the two to control, and as such most manufacturers have little difficulty in this area. All that is usually required is to ensure that the correct materials are purchased (quality as well as quantity), and the correct quantity is actually used.

Control of Labour however is another matter. The major obstacle to Labour control is the lack of accurate and immediate shop-floor data feedback. The traditional method is by the collection of Time Sheets filled out by the operator. Time Sheets are notoriously inaccurate and require processing, with the results that when you get the information it's too late and wrong anyway.

The ManuDyn system is designed for dynamic shop-floor data collection. We employ various shop-floor data collection devises such as touch screens, barcode workstations, scanners and swipe cards, tablets and phones. The entire basis of the system is built around the need to provide Dynamic Resource Control.

ManuDyn is an MRP/ERP system with Dynamic Resource Control (DRC).

Dynamic shop-floor data feedback, in the first instance, provides a tool for efficient process control and production scheduling. It also provides the ability for immediate Job Cost reporting, which is the basis for cost control.

The ManuDyn Job Cost reporting facility uses the actual labour time and the actual material quantity used to provide a variance analysis for the job.

The system provides the tool. Nothing, however, will happen unless you take some action. First you need to get the Job Cost report. Not when the job is finished, but rather, while it is still in production. It is too late to take any corrective action if the Job is finished.

Next you need to enquire as to the causes when jobs go wrong (that is, there is a significant labour or material variance). Generally speaking there are just two reasons for a Job variance, namely:

- The Job has been manufactured incorrectly.
- The original estimate was wrong.

If it is the latter, then the Job Cost analysis provides feedback to the estimator. In the first instance, to amend the Part to ensure it is correct the next time it is quoted or manufactured. Secondly, so the estimator does not make the same mistake the next time with a similar Part.

There are an infinite number of reasons why a Job may be manufactured incorrectly, only one of which is because of an operator error. Some of the other reasons are:

- Faulty Materials.
- Faulty machinery, tools and equipment.
- Material not arriving on time in order to complete the job.
- The operator did not know what to do or was poorly or inadequately trained.
- The wrong tools or equipment were used because it was all that was available at the time.
- The operator instructions were incomplete or just plain wrong.

All of the reasons, why jobs go wrong, represent management problems, which need to be resolved. As such, they represent opportunities for productivity improvement and greater profits.

Now, the manager is not going to know there is a problem unless an enquiry is made. That is, you need to determine that there is a variance and then ask what went wrong.

Do you need to do this for every job that goes through production?

This would be difficult and in any case it is probably impossible. There are time and resource constraints that would generally prevent this. All that the Manager needs to do is to select one job each day and follow it up. Even jobs selected at random will eventually bring to light the major problems associated with your manufacturing operations.

At this point I believe I have provided you with sufficient information to answer questions concerning what ManuDyn is, and what it provides.

ManuDyn is a manufacturing software package, designed from a manufacturing perspective, which provides a Dynamic Resource Control facility to help you control your manufacturing operation.

In particular ManuDyn is concerned with providing a Labour and Material cost control facility.

Implementation

The second section to this seminar is concerned with how to best go about implementing ManuDyn system. The first point that needs to be made is that implementing a software system like ManuDyn is in no way different to implementing any piece of capital equipment. Such an implementation should be taken on as an ***Engineering Project***. That is:

- An implementation team would be established and the members of the team, with the appropriate skills, would be defined.
- Regular planning meetings would take place where, in the first instance, tasks will be identified and responsibility to complete the tasks assigned.
- Meetings would be frequent during the early stages becoming less frequent as the project draws to a conclusion.
- Those responsible for these tasks would report progress back to subsequent meetings, where problem areas and remedial plans would be put into action.
- The meetings would be documented and the minutes distributed to all parties concerned, together with other interested onlookers.
- There would be an implementation plan to be carried out within a set time frame objective otherwise it simply would not happen.
- There would be a conclusion to the project.

The ManuDyn system must be installed like an Engineering Project.

What are the primary tasks that need to be undertaken during the implementation phase and what are the stages leading to commissioning the system?

There are two concurrent streams of activity that need to be undertaken in the implementation phase, namely:

- To undertake a training program for all appropriate personnel.
- To compile and input the system Base Data.

The stages after this include:

- Commissioning the System.
- Operating the System by using the Purchasing and Scheduling functions.

- Initiating MRP Operations.

Each of these will be examined below.

The Video Tutorial Training Program

Not all staff need do all video tutorials. The outline below should be a useful aid to determine who should do what.

Video Tutorials by category:

ManuDyn Overview: https://www.youtube.com/watch?v=A5vkfnQmb-8
Another ManuDyn Overview: https://www.youtube.com/watch?v=QPdgC_eQNiE

1) Database Entry
Create a Customer & Vendor: https://www.youtube.com/watch?v=ft78FgYQnDY
Create a Material Item: https://www.youtube.com/watch?v=MjRKhffD554
Create a Manufactured Item: https://www.youtube.com/watch?v=_me8Z5hP-t4

2) Quoting
Raise a Quote: https://www.youtube.com/watch?v=EezsxQTxurI

3) Sales Orders:
Create a Sales Order: https://www.youtube.com/watch?v=J1USMnzF8lw
Order Completion & Despatch: https://www.youtube.com/watch?v=gIzpmBRj77k
View Gross Margin Report: https://www.youtube.com/watch?v=5breWVadE8k

4) Scheduling:
Issue a Job to Production: https://www.youtube.com/watch?v=4NqE48bMmDE
Scheduling: https://www.youtube.com/watch?v=IHZ0Zs071Bw
Record Job Progress: https://www.youtube.com/watch?v=yLlnBWuTDXo
Record Job Progress in Real Time: https://www.youtube.com/watch?v=Tu0WZp2cJ-0
Job Cost Reporting: https://www.youtube.com/watch?v=Nxi-h71eQXM

5) Purchase Orders
Receive a Purchase Order: https://www.youtube.com/watch?v=hYtsjcD3gMg

6) Inventory Control
Order Processing: https://www.youtube.com/watch?v=PRuq4sb_zq4

7) Accounts Payable

8) Accounts Receivable
Order Completion & Despatch: https://www.youtube.com/watch?v=gIzpmBRj77k

9) General Ledger
QB/ManuDyn Inventory Part 1: https://www.youtube.com/watch?v=euJhrcO8LXc
QB/ManuDyn Inventory Part 2: https://www.youtube.com/watch?v=XWW6ZElLSGE
QB/ManuDyn Weekly Time Sheets: https://www.youtube.com/watch?v=KhpIZWpSEZs
QB/ManuDyn Employee Time Sheets: https://www.youtube.com/watch?v=fgXJl4A64u4
QB/ManuDyn Pro Premier Perpetual: https://www.youtube.com/watch?v=TTbfW6WQT1U
QB/ManuDyn Pro Premier Setup: https://www.youtube.com/watch?v=oHStL-8EVcU

10) Reporting
Create a Custom Report: https://www.youtube.com/watch?v=F3WgyEKU1bU

11) System Settings
Complete System Configuration: https://www.youtube.com/watch?v=i0dG8wHkVjw
Configure Product Types: https://www.youtube.com/watch?v=pGOOmsLhHuc
Configure Work Areas: https://www.youtube.com/watch?v=7_YEuZQgGDA
Add a New User: https://www.youtube.com/watch?v=u14s2nocR0Q

STAFF	1	2	3	4	5	6	7	8	9	10	11
SYSTEM SUPERVISOR	*	*	*	*	*	*	*	*	*	*	*
ESTIMATING	*	*								*	
SALES	*	*	*							*	
MANUFACTURING	*		*	*		*				*	
PURCHASING	*				*	*				*	
ACCOUNTS	*				*	*	*	*	*	*	
MANAGEMENT	*									*	

Some points to note here are as follows:

- The video tutorials need to be done/looked at more than once. The first time through the operator may retain 50% of the information. If the tutorial was done again within 24 hours, maybe 70% would be retained and if it was done a third time after say 1 week then maybe an 85% retention rate would be achieved.
- The video tutorials will need to be done away from the operator's normal place of work (to avoid interruptions and ensure their full attention).
- Some people work better in small groups and can help each other.
- The project team members will need to do the tutorials first to stay one step ahead of the other users.
- You will need to define a time table to ensure a specific time set aside for each trainee to do the appropriate tutorials in a logical sequence.

This phase can last as little as 2 weeks. Depending on the scale of the installation, and the number of people involved, this phase can be 6 to 8 weeks and even longer.

Entering the Base Data

The ManuDyn Base Data consists of the *COMPANY Table (*Customer & Supplier) and *ITEMS Table* (raw materials and manufactured items), and will need to be entered before any significant use of the system can be obtained and in particular before parts are established.

The Client will also need to establish a coding system for Companies, Stock and Parts. This is the subject of the next seminar in this series and as such will not be examined in detail here.

Getting the base data established is vital to a successful and rapid implementation of the ManuDyn system.

There are only two options available to achieve this, namely:

- Enter the data in manually.
- Use the ManuDyn Import capabilities to bring existing data directly or indirectly into the system.

We can help you with the latter but not the former. This is one of the main things we try to do during the initial installation phase. If we can not complete it (usually because the client wants to change the data), then we make sure that the framework is in place to complete this task.

You should take particular note that if you employ anyone, in a temporary capacity, to assist with the additional workload associated with the implementation, that such help gets employed on the old tasks that are likely to disappear, and not the new.

This is a common trap. If the new help gets allocated to the new tasks then they become indispensable and they become permanent. Don't fall for this one.

Commissioning the System

The ManuDyn system can be said to be commissioned and operational once the Sales Orderr "Book" is established and maintained. As such, all efforts should be leading towards this end.

To establish the Order Book you are required to define the Part. Now this can be as simplistic as just the Part Number and its description or it can include the full BOM and routing definition. Creating just the Part and its description is quick, however, there will be nothing else you can do with the system once the Order Book is established. You need the BOM and Routing to do Purchasing and Scheduling.

Creating the full definition for all of the parts may take considerable time. You need to remember, however, that in order to establish the Order Book, you only need the current parts. More specifically you need the parts that will be current at the time when you want the Order Book to be established.

The Sales Order "Book" can be established when you have Manufactured Item (Parts) which define all the current Jobs. It can be maintained when you can process the order entry for new Jobs (for which you may need new Parts), and despatch (invoice) the completed Jobs.

Operating the System

In this phase the Manufacturing Control System and the Manufacturing Inventory Control Systems should be made fully operational for the purposes of Scheduling and Purchasing respectively. These activities represent the main operational aspects of the ManuDyn system.

These functional activities may be activated separately, or concurrently, depending on the resources available. If activated separately, then the level of interaction between the two functions should be kept to a minimum.

The concurrent activation of the two systems is not the usual option adopted by our Clients. Most companies simply do not have the resources available.

How ever if it is done there is one thing that is essential, namely:

You will need to do trials in order to establish the operational parameters for these functional areas, and once defined, ensure they are adhered to.

It is essential that the operational parameters be established before the full merger into the MRP System. You will cause chaos if this is not done.

MRP Operations

During this stage the full MRP System is activated once all of the operational parameters have been clarified. There is no general rule to follow here except for one and that is:

ESTABLISH THE PROCEDURES AND FOLLOW THEM RELIGIOUSLY

In effect, an MRP system operation requires discipline on the part of the operators in order for it to succeed.

The implementation stages discussed above have been summarised in Figure 2 below. You should note that some of these stages may be carried out concurrently and that the system can be said to be commissioned once the training program is complete and the Order Book is established.

ManuSoft DRC Implementation

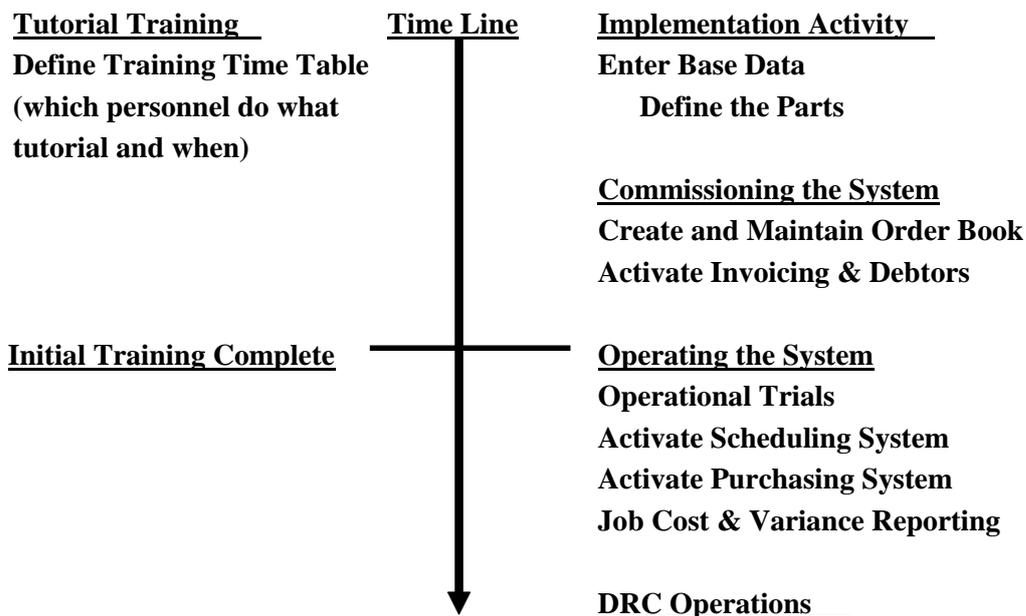| Tutorial Training	Time Line	Implementation Activity
Define Training Time Table (which personnel do what tutorial and when)		**Enter Base Data** Define the Parts
		Commissioning the System Create and Maintain Order Book Activate Invoicing & Debtors
Initial Training Complete		**Operating the System** Operational Trials Activate Scheduling System Activate Purchasing System Job Cost & Variance Reporting
		DRC Operations

Figure 2   Implementation Summary

You should take particular note that it is important to set the ball rolling. You should make sure that the project team is in place and that the initial stages of the plan are, at the very least, being discussed.

Concluding Remarks

The Seminars are designed as a supplement to the ManuDyn Tutorials training video's. As you examine these seminars you will discover an operational philosophy, associated with the ManuDyn system, which allows the user to take best advantage of its dynamic capability.

The purpose of these Seminars is to examine this philosophy and, at the same time, present the user with a greater understanding of the ManuDyn system. At this juncture, however, I wish to make the point that the ManuDyn system is just a tool and, on its own, is not enough for you to achieve control over your manufacturing operation. In the end it will mostly depend on how you use the tools you have available.

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