Sales Order Processing

Introduction (Seminar 6)

As a manufacturer there are two main operational questions that you need to answer with regard to Sales Order processing in the Manudyn system, namely:

- When to release the Job to production.
- When and how to record material usage with respect to relieving Stock and recording Job Cost information.

The question as to when to record Job Cost Labour information is usually straight forward. This should be done as it happens, through the dynamic data collection facilities available with the Manudyn system. We will examine this in other seminars.

This seminar is concerned with providing an answer to the two questions above. Before we proceed however, we need to define a few terms associated with some cumulative registers associated with the Stock and Inventory system.

First there is the Quantity in Stock (QS). This represents the total amount of goods, from all stores, which is held in Stock.

Next there is the Quantity on Order (QO). This is the total amount of goods, represented by all outstanding Purchase Orders (and Manufacturing Orders where you are the Supplier as the Part is also a Stock Item).

The Quantity Committed (QC) represents the Raw Material requirements as determined by a Bill-Of-Material explosion of the Part Number associated with a Job (to be manufacture), and includes Finished Goods requirements held in the Stock file for a customer Sales Orders.

The QS, QO and QC are the key cumulative Stock registers, used by the system to regulate the *Inventory/Order Processing* menu item routine. Changes to these registers as a result of purchasing will be examined in another seminar. In this seminar we will examine changes to these registers as a result of order processing.

Job Issue to Production

When a Job is entered as a Sales Order the initial status is *TO ISSUE* (not started).
A Job Status of *ISSUED* corresponds to a Job that has been "issued" to production, and for which no job progress is recorded. The Job Status changes during processing and the "Status" in the system is the last operation that has been recorded.

Jobs are "Issued to Production" via the *Scheduling/Job Issue* menu item. To issue a Job you need to first recall it and the best way to do this is to use the Lookup which is automatically filtered to show only those Jobs waiting to be issued. Upon job recall a screen display similar to that shown below will result, if the Job Status is *TO ISSUE* (not started) or *REMAKE* (start again).

Once the Job is recalled the quantity in stock (QS), on order (QO), and committed (QC) are shown for each associated Bill-of-Material item, to assist in selecting which Items are to be issued (and from which store if there are multiple stores), as shown below.

To "Issue" the Job just select the "Issue" button at the bottom of the screen..

The action of "issuing" a job to production is an essential processing stage. The Job cannot start until you release it to production. So what else has happened?

Firstly, the Job has now been placed on the Schedule. You can see this by going to *Scheduling/Scheduling* menu item and recalled one of the active work centers as shown below,

Secondly, if the "Relieve Stock at Job Issue" option is selected in the *System Setting/General Options* tab, as shown below, the quantity in stock (QS) will be relieved in accordance with the issued quantity.

If the "Relieve Stock at Job Issue" option is not activated then this function will have to be performed manually and depending on the delay time between issuing the job and relieving the stock there may be some discrepancies with the MRP processing. That is, because commitments are relieved the current job the system may "report" that stock is "available" for other jobs as the material this job has not been "withdrawn" from stock.

With this option activated the raw material commitments that are established at Sales Order entry will be relieved and set to zero for each Job, so issued. The status of the Job immediately prior to the Job Issue will be *TO ISSUE* or *REMAKE*. The job status immediately after Job Issue is *ISSUED*.

Finally, where the stock is issued to the Job the Job Cost (materials) are recorded, once again in accordance with the Bill-Of-Material requirements and the issued quantity, as shown in the Job Cost Report below:

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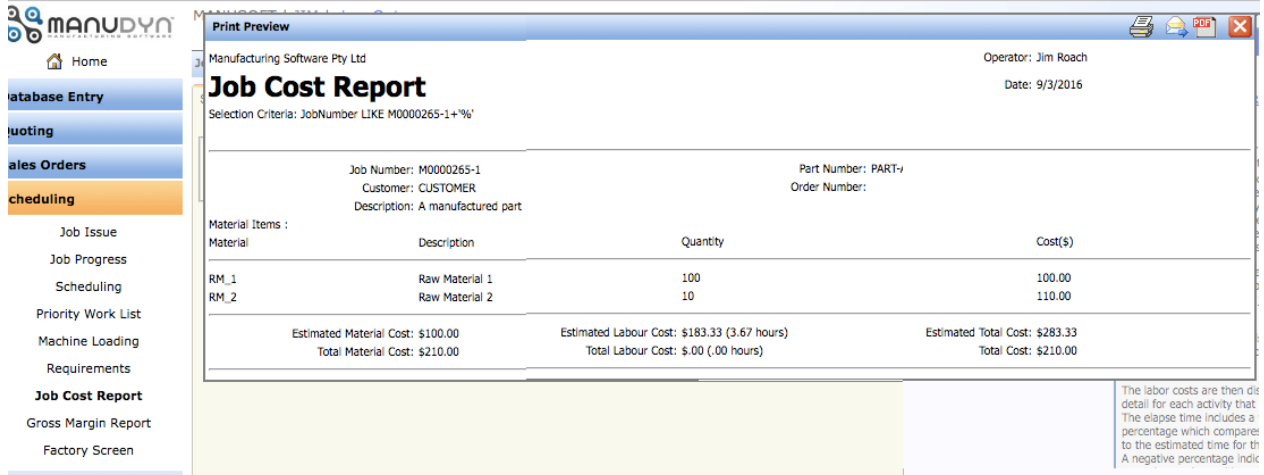
In summary you should take note of the following:

The Raw Material commitments are assigned to a Job if the status of the Job is either TO ISSUE or REMAKE.

And;

If the status of the Job is anything other than TO ISSUE or REMAKE the Raw Material commitments will be set to zero.

Activating the Relieve Commitments option will cause the system to ***relieve the Raw Material commitments for all of the items on the Bill-Of-Material of a Part*** **at the point of Job Issue** to production.

If the Relieve Commitments option is not activated then ***the Raw Material commitments for all of the items on the Bill-Of-Material of a Part, will be relieved when the Job is removed from the MOB file***. This is equivalent to what is called "Back Flushing" in a classical MRP sence.

Restarting a Job

If a Job needs to be re-processed (or started again) at any point its status is marked as *REMAKE* (start the Job over again).

A "Remake" for a job is processed via the *Sales Order/order Management* menu item by first recalling the Job as shown below:

Figure 1- Sales Order Review

Then select the Grid item that you wish to "remake" which recalls the Item detail dialog. The "Remake" option is hidden away in the bottom left hand corner of this dialog and when selected the operator is required to indicate the reason for the remake and whether or not the materials needs to be re-issued (see screen display below)

When you create a Remake you may be prompted with the dialog shown below if there is excess, un-allocated stock.

This gives you the option to reduce the remake quantity.

In summary, the "Remake Order" button performs the following tasks:

- The percentage done for all operations will be set to zero.
- The Job Status is set to "REMAKE".
- If the job is in production (present on one or more Touch Screen schedules), it is removed from each Touch Screen schedule, onto which it may be loaded.
- If you opt to replace issued materials the BOM requirements are re-established and recorded as Stock item commitments.

The action of the "Remake" button is to start the job over again setting the job status to REMAKE, and removing it from production.

Removing a Job from the Sales Order list

There are a number of places within the system where a Job may be removed from the Sales Order list, as follows:

- The Job may be deleted (provided there are no related transactions).
- The Job may be invoiced (if it is for a Customer).
- A Job may be removed from the MOB file automatically (if it is a sub-assembly), and the last operation is completed.

A Job with no transactional data can be deleted by recalling it in Sales Orders/Order management and selecting the delete option. Deleting Jobs is not recommended however as it leaves a "hole" in the job number sequence and there is no direct audit trail (there is a Stock Audit Trail which monitors the change in commitments but this is primarily listed by a Part reference).

Customer Orders are usually completed by invoiceing as shown below:

Sales Order for Customers may be dispatched through *Sales Orders/Order Despatch* or invoice from *Accounts Receivable/Invoices*. The two routine do essentially the same thing. Once you recall the page you can start the invoice by either selecting the New Icon (which causes the focus to shift to the sales order field) or more commonly use the Lookup/Search button to select the Sales Order number directly.

Existing invoice can be recalled and other items added to them by using the Lookup/Search icon in the blue tool bar as shown above.

OK, so that's it for invoicing or dispatching of Customer order– what about the sub-assembly jobs?

Sub-Assembly jobs in ManuDyn and easily identified because the Customer is YOU. These jobs represent sub-components of the Customer Sales Order (which are parts in their own rite with a separate manufacturing job ticket). These jobs cannot be invoice (because the Customer is you and you can't invoice yourself). They have to be finalised by indicating that the last operation is complete and the quantity you complete is the quantity that goes into stock.

The last operation of a sub-assembly job is critical and as a general rule this function should be carried out by a "responsible adult". The last operation should not be completed by operators on the factory floor. It is recommended that a "STORES" process be added as the last operation of all sub-assemblies with an operation description such as "Check Count and update job status".

This allows stores personal to check the goods before that are "entered into stock" within the system.

The Job status update routine is accessed from the *Scheduling/Job Progress* menu item. Once you recall a job the screen display will look something like this:
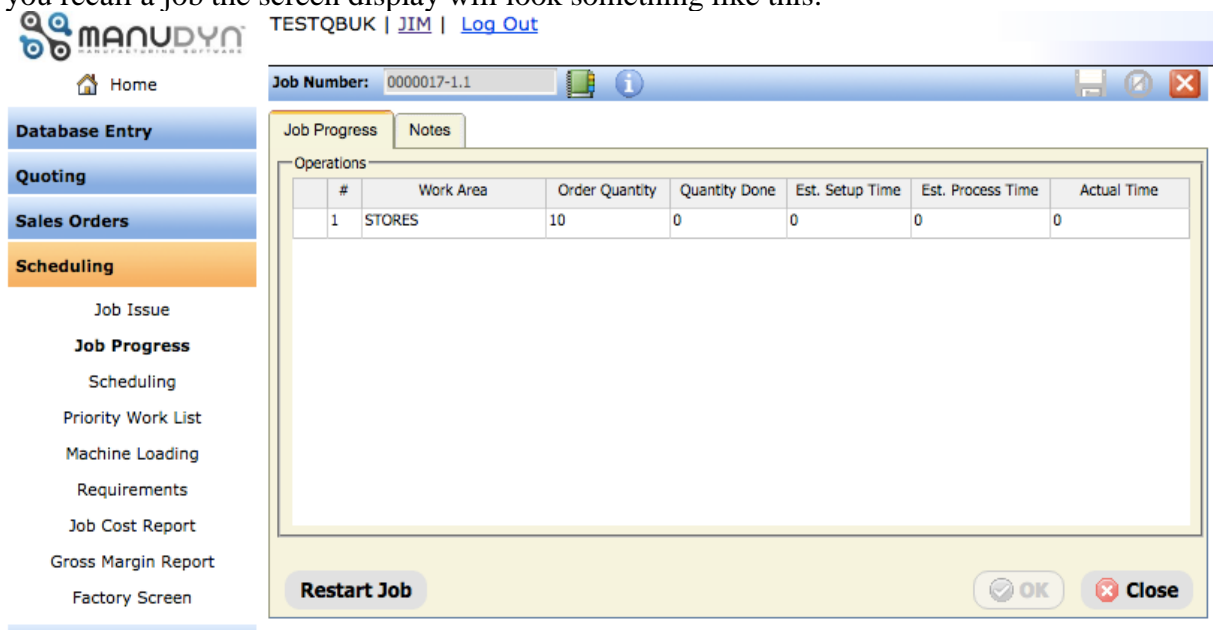
Select the Grid item that represents the last operation to recall the detailed dialog. Enter the quantity done, the elapse time and the employee who did the work. You screen display should look similar to that shown below:

Once you select the OK button the routine passes back to the previous screen but thios time we can see the progress that has been entered. To record the progress and finish this job select the OK button at the bottom of the screen.

The Sub-Assembly finished goods will go into stock ready for the release to production of the Final Assembly which will "draw the stock".

You should note that **if a Job has no processes** listed in its routing then **issuing it to production will complete it.** The Quantity Committed (QC) against the Items in the Bill-Of-Material (BOM) for the Job will be relieved; if the "Relieve Stock at Job Issue" option is activated then the Quantity in Stock (QS) for each item in the BOM will also be relieved and added to the Job Cost; AND the Finished Goods (represented by the Job) will be placed into stock.

Stock, Commitments and Job Cost Relationship

So let's look more closely at the inter-relationship between the Quantity in Stock for an Item, the Quantity Committed for that Item and the Job Cost registers.

Firstly, Raw Material Commitments (QC) are established at the time of Sales Order entry. They may be relieved either when the Job is issued to production, in which case there is a relationship between Job Status and the QC, or they can be relieved when the Job is completed, in which case there is no such relationship.

Secondly, there is an option to Relieve Stock (QS) and Record Jobcost at the time of Job Issue. This is also the point at which the Job is initially placed on the Dynamic Touch Screen schedule.

You can probably guess from the way these statements are phrased which options are recommended. The relationship between the Job Status and the Raw Material commitments is important. It is the basis for example of the Work-In-Progress determination. This is not the only reason however for this recommendation.

The Job Issue menu item is the only location within the Manudyn system where all three actions, namely, Relieving Stock, Recording Jobcost and Relieving Commitments, can happen at the same time. To explain why we recommend that the commitments (QC), be relieved at the time of job issue we need to examine the various options available for relieving Stock (QS) and also for recording Job Cost materials. The table below details the other locations in the system where these things may happen (mostly independently).

Section	Stock Table Qty. in Stock	Stock Table Qty. Committed	Job Cost Table
A) Scheduling/Job Issue menu item	Will relieve inventory (optionally and based on estimates) if "Relieve Stock at Job Issue" is activated	Will reduce the commitments at job issue.	Will add BOM items to the Jobcost (based on stock issue)
B) Scheduling/Job Progress menu item	No effect	If job is at *TO ISSUE* or *REMAKE* will reduce the commitments	No effect
C) Inventory/Store Issue or Return menu item	Will relieve/increase inventory based on actual quantity.	No effect	Will accrue/reduce material data only if job number assigned
D) Scheduling/Factory Screen	Will relieve inventory Based on actual quantity	No effect	Will accrue material data against the Job

There are two "problems" that you may encounter with recommendation A) above. The first is what happens if we relieve commitments and inventory at the same time, when there is no raw materials in stock available.

As the inventory has been relieved the quantity in stock for the raw material will become negative by an amount equivalent to the "unfulfilled" commitments (QC). This is not as bad as it sounds and in fact is a requirement for an MRP system, and particularly where the Commitments have been relieved. Let's explain this by example.

Assume the Quantity in Stock (QS) is zero and the Quantity Committed (QC) is say 100 units. Relieving both the inventory and the commitments will cause QC to become zero and QS to become –100. All that has happened is that the commitments have been relocated as a negative quantity in stock. That is:

Negative Stock represents commitments for materials that still have to be provided.

The second "problem" associated with relieving inventory, recording Job Cost and relieving the commitments through the Job Issue routine, is that this is all done according to estimates. As such there is a need to also record the "extras" that were used over and above the estimates. The need to record "extras" usually represents additional operator actions and, as such, is not looked on kindly. What then are the alternatives?

The routine most often used alternative is the Stores Issue facility, where actual material quantities may be issued from Stock (QS) and actual materials may be recorded as Jobcost (item C) in the table above). The screen display upon recalling a Job from the *Inventory Control/Store Issue-Return* menu item is as follows:

The stores issue will occure once the OK button is selected.

The Stores Issue routine will relieve Stock (QS) according to actual quantities issued and Jobcost where a job assignment is made. This option does not relieve commitments (QC). This will be done at the Job Issue or when the Job is complete whichever occurs first.

What is actually recommended is a combination of item A) from the above table, with all options turned on, with a selective Stores Issue from item C) to cover the extras (over and above the estimates).

It is important to record actual material usage both in the Job Cost file and also in relieving Stock (QS). The Raw Material Commitments (QC) are established according to estimates, and when they are relieved it will be done also according to estimates. If we use item A) option above to do all of this then the extra material usage (over and above the estimates) will need to be recorded.

As in all things the 80/20 rule will apply. That is 80% of the BOM items will be used in accordance with the estimates so item A) will be satisfactory for these. There will need to be an adjustment for the 20% of items where this is not good enough.

Now, the Job Ticket defines the materials required for the Job and as such represents the "authority" to use a certain quantity of those materials. The Job Issue has taken account of these materials so all the operator needs to do is to indicate, on the Job Ticket, that the allowed materials have been taken (that is, it needs to be "signed off"). If subsequently more material (or less material), has been taken (or returned to store), then this also needs to be indicated. The question is where?

If you use the Job Ticket it may be some time before this is reported back to the office for system processing. This can be overcome through the use of a material requisition however this is a "loose piece of paper" and as such is likely to get lost.

I recommend the use of a "Extras Book" into which the extra material usage may be recorded. The "Book" should be located at a strategic point within the factory and collected daily for system processing.

One advantage of processing the extras in this way is that if the "Book" had no entries in it today then either, everything today has gone according to plan, or the task has not been done as directed. This method has an automatic audit facility built in.

Note i.   You need to ensure that there is no double accounting associated with relieving stock and jobcost material recording. Clearly defined operational procedures will be required to prevent this from occurring.

Note i.   One other point worth noting concerns which material price is used when recording Job Cost information. This is always the Average Cost stored against the stock item. That is if I receive 100 units at $1.00 with nothing in stock the average is $1.00. If I then receive 100 at $2.00 there will be 200 in stock at an average cost of $1.50.

There is an alternative to the "Book", however it will mean allowing your factory operators direct access to the Stock file and in particular giving them the facility to change the Quantity in Stock directly. This is option D) in the table.

So far we have examined how to issue jobs, when and how to relieve commitments, to record material usage, and the Job Cost information. The effects of issuing jobs to production have also been explored. One important aspect of Job Issue which has not been discussed is *when* should jobs be issued to production. In answering this question we will define the first of the Manudyn "Golden Rules".

Rule Number 1

The principal objectives of the manufacturing process is to make the product according to specification and deliver it on time.

There always seems to be a number of "Gremlins" in the "System" however that contrive to prevents the manufacturer from doing this. The material is not delivered on time, when it is its wrong. Then the tool is faulty and the operator does not know how to do the job or the program is not ready or wrong. When I get all this right I find that the loading in one area of the manufacturing process is twice the available capacity and in other areas there is no work at all.

The Job is now running late, and the Customer is "screaming", so I work extra overtime and put off other jobs to do this one, with the result that they are late also and hence the need to work even more overtime. Then the Customer changes his mind, or the specifications changes, so the job gets placed on hold halfway through production. I release more work to keep every one occupied and the result of all of this is that Work-In-Progress and lead times have both "blown out".

You have to be mad to be in manufacturing. But, does it need to be like this?

The first point to make is that, in Jobbing, you can not predict what is going to happen next and as a result you therefore need to retain maximum flexibility of action for as long as possible.

You would also need to:

Plan and prepare the Job before issuing it to production.

You would not issue a job to production if it was not going to be worked on, that is, if the capacity was not available, or the tools are not ready, or the material was not available, or if it was not needed until next year.

These are all obvious and important considerations prior to releasing a job to production. There are other things, particularly with regard to Work-In-Progress (WIP), and production Lead Time, that are obvious.

Firstly, the objectives of a manufacturing manager include trying to minimize WIP and Lead Time. The two tend to go hand-in-hand. For example, assume you had a fully staffed manufacturing facility with no WIP and you introduced just one job. This job would pass through the process without delay (assuming you and not the operators are in control), and in doing so the WIP would have been minimized.

Now assume your control and planning is so good that the amount of work in production balances the capacity perfectly. What you would achieve in this situation is the minimum level of WIP, consistent with maximized throughput and the shortest possible Lead Time.

If you introduced one more job the capacity would be exceeded. The job would add to WIP with no increase in output. Another example is where capacity is available, but there is a shortage of materials. If you released this job it can be started but not finished until the balance of the materials is procured. Again WIP would increase.

You should now be at the stage where you can define Rule Number 1 yourself. My definition is something like this:

Never release a Job to production unless you can work on it and the Job can be finished.

How literally should this rule be taken?

I don't know. It's not for me to say. You know your situation better than I do.

Would you, for example, hold onto a job waiting for the packaging materials that are not required for some days, and you have time to organize their procurement? Probably not!

Would you release a job to production when you have only half of the materials required to start the job? No you wouldn't. What you would do (or should do) is split the job into two parts. The part you can do and the part you can't. You would assign a new Job Number and due date to the latter.

If you release a job to production and the factory is short on capacity the question is who is then responsible to ensure that the job is finished on time? This is an easy one – You are.

If you release a job to production and you are short on materials who is responsible for ensuring the job is finished on time? Once again – You are.

Most people would say it's the responsibility of the Purchasing Officer to procure the material on time. Well, that's true. But you are still responsible for finishing the job.

Effectively, if you release jobs with insufficient materials then you will need to follow it up to ensure that materials arrive when you want them. The Purchasing Officer can help but in the end it was your decision to release and we all know where the buck stops.

Concluding Remarks

Jobbing manufacturing is not easy. Its sometimes called Murphy's Law, that is, what can go wrong will go wrong. It's as if the Gods are conspiring to prevent a successful outcome at almost every turn.

What is really happening is that you effectively lost control of the job, immediately it was placed in production. Up until that time you could plan and prepare to manufacture the job. As soon as it was released the operator assumed control of the job.

To retain maximum flexibility, and to keep your options open, you should not release the job to production until it is needed and in general Rule Number 1 should apply.

The application of this rule will result in minimum WIP, maximum throughput, and produce the shortest possible production lead time.

Now this all sounds good to me.