ramco

RAMCO AVIATION SOLUTION
VERSION 5.9

USER GUIDE

PART MANUFACTURING

ABOUT THIS MANUAL

This manual briefly describes the basic processes and functions in Ramco Aviation Solution.

WHO SHOULD READ THIS MANUAL

This manual is intended for users who are managing the Aviation industry processes and are new to Ramco AviationSolution. This manual assumes that the user is familiar with the Aviation Industry nomenclatures and systems based software.

HOW TO USE THIS MANUAL

Ramco Aviation Solution provides extensive Online Help that contains detailed instructions on how to use the application. Users are suggested to use this manual for specific references, along with the Online Help. This manual contains enough information to help the users perform the basic tasks and points toward the Online Help for more detailed information.

HOW THIS MANUAL IS ORGANIZED

The User Guide is divided into 4 chapters and index. Given below is a brief run-through of what each chapter consists of.

Chapter 1 provides an overview of the **Manufacturing Setup** business process and the entire manufacturing process. The sub processes are explained in the remaining chapters.

Chapter 2 focuses on the **Manufacturing Definition Setup** sub process.

Chapter 3 dwells on the **Shop Planning and Execution** sub process.

The **Index** offers a quick reference to selected words used in the manual.

DOCUMENT CONVENTIONS

- The data entry has been explained taking into account the “Create” business activity. Specific references (if any) to any other business activity such as “Modify” and “View” are given as “Note” at the appropriate places.
- **Boldface** is used to denote commands and user interface labels.

  Example: Enter **Company Code** and click the **Get Details** pushbutton.
- Italics used for references.

  Example: *See Figure 1.1.*
- The  icon is used for Notes, to convey additional information.

REFERENCE DOCUMENTATION

This User Guide is part of the documentation set that comes with Ramco Aviation Solution.

The documentation is generally provided in two forms:

- The Documentation CD in Adobe® Systems’ Portable Document Format (PDF).
- Context-sensitive Online Help information accessible from the application screens.

WHOM TO CONTACT FOR QUERIES

Please locate the nearest office for your geographical area from www.ramco.com for assistance.

INTRODUCTION

Part Manufacturing module is built to address the needs of Manufacturing Planning and Control in Aviation manufacturing facilities. The product offers an array of features for estimating, execution of tasks, costing, lot and serial tracking, purchasing/receiving, back flushing, material verification and material requirements planning. Part manufacturing addresses many aspects of the manufacturing process. The part could be manufactured from different sources like manufacturing in-house, sub contract or purchase and stocked in multiple stocking points and warehouses. Part manufacturing helps in efficient planning considering the capacities and stock availability across locations and warehouses. Part manufacturing covers the Make-to-order environments including products, which are finished after receipt of a customer or internal demands. The final product is usually a combination of standard parts and parts custom designed to meet the special needs of the customer.

The **Part Manufacturing** User Guide addresses various aspects of the part manufacturing process, and facilitates part manufacturing through make work order. The business process comprises of two sub processes: **Manufacturing Definition Setup, Shop Planning and Execution**.

Manufacturing Definition Setup sub process focusses on defining source for manufacturing and other requisite information like bill of materials (BoM), product structures and process plans. Engineering drawings that detail the manufacturing and assembly of products are also defined in this sub process.

Shop Planning & Execution sub process aids in planning material requirements, execution of tasks and reviewing / managing the certificate requirements for the Work Order.

- ***Shop Planning*** facilitates the production planner to plan his part requirements for the manufacturing job and also plans his material requirements based on the Planned Start date of the task. A facility to capture manufacturing details and certificate details is also provided.
- ***Shop Execution*** provides the facility to execute the tasks and also enables reviewing / managing the certificate requirements for the Work Order. And also provides a list of all the certificates that needs to be printed for the Work Order #. And also it facilitates to return the manufactured parts to respective return warehouses.

The process flow diagram of Part Manufacturing is shown in Figure 1.1:

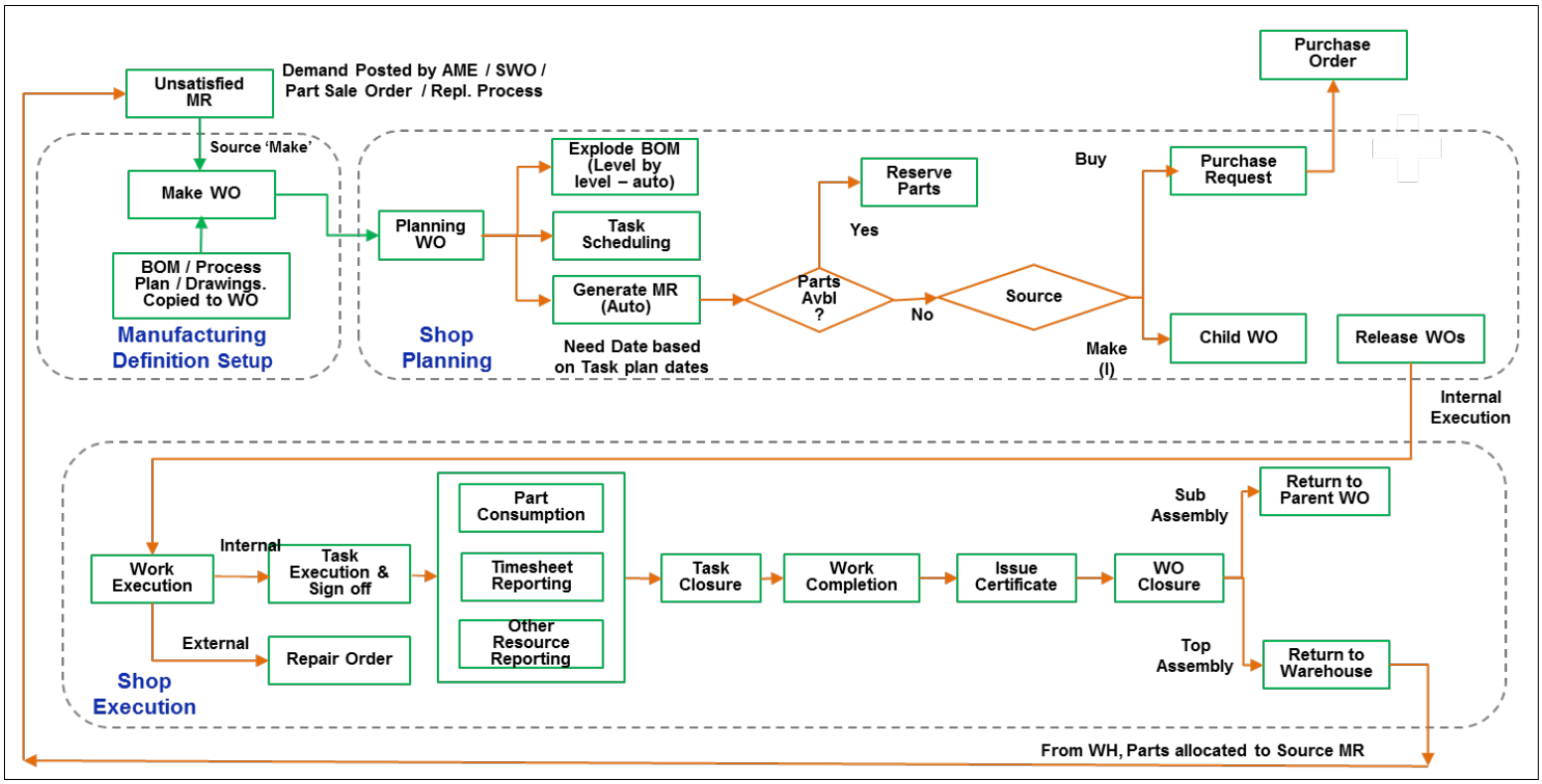

Figure 1.1 Part Manufacturing process flow

MANUFACTURING DEFINITION SETUP

The **Manufacturing Definition Setup** sub process facilitates defining source for manufacturing and other requisite information like product structures, bill of materials (BoM), and process plans. Engineering drawings that detail the manufacturing and assembly of products are also defined in this sub process.

The **Part Administration** business component provides the ability to define the source as 'Make' which is a pre-requisite for manufacturing a part. Along with the source definition, the basic manufacturing information like Lead Time, UoM, Work Center Information, Certificate Information etc. can also be defined prior to creating Make Work Order.

The **Process Plan** business component enables identifying the tasks and the sequence in which the tasks are performed to manufacture the part. It is also referred to as routing information. Two types of Process plans can be defined: 'Standard' can be used against any part manufacturing. Another is specific, which will be defined for the specific Part #.

The **Product Structure** business component facilitates defining product structure which represents one level of constituents, consisting of materials or component parts or phantom parts for a manufactured part. The business component also aids in reviewing the Bill of Materials (BoM) and define Engineering Drawings.

2.1 DEFINING PART MANUFACTURING INFORMATION

You can capture the basic information required to manufacture a part, like 'Lead Time', 'Mfr. Valuation Method' (Stock Valuation), 'Default Work Center', etc. Certificate details required to be issued for the finished parts can also be defined in this page. You are required to define the Source of the part as "Make" in the **Maintain Planning Information** page of the **Part Administration** business component.

2.1.1 DEFINING PART MANUFACTURING INFORMATION

1. Select the **Maintain Part Manufacturing Information** link in the **Maintain Planning Information** page in **Part Administration** business component. *See Figure 2.1.*

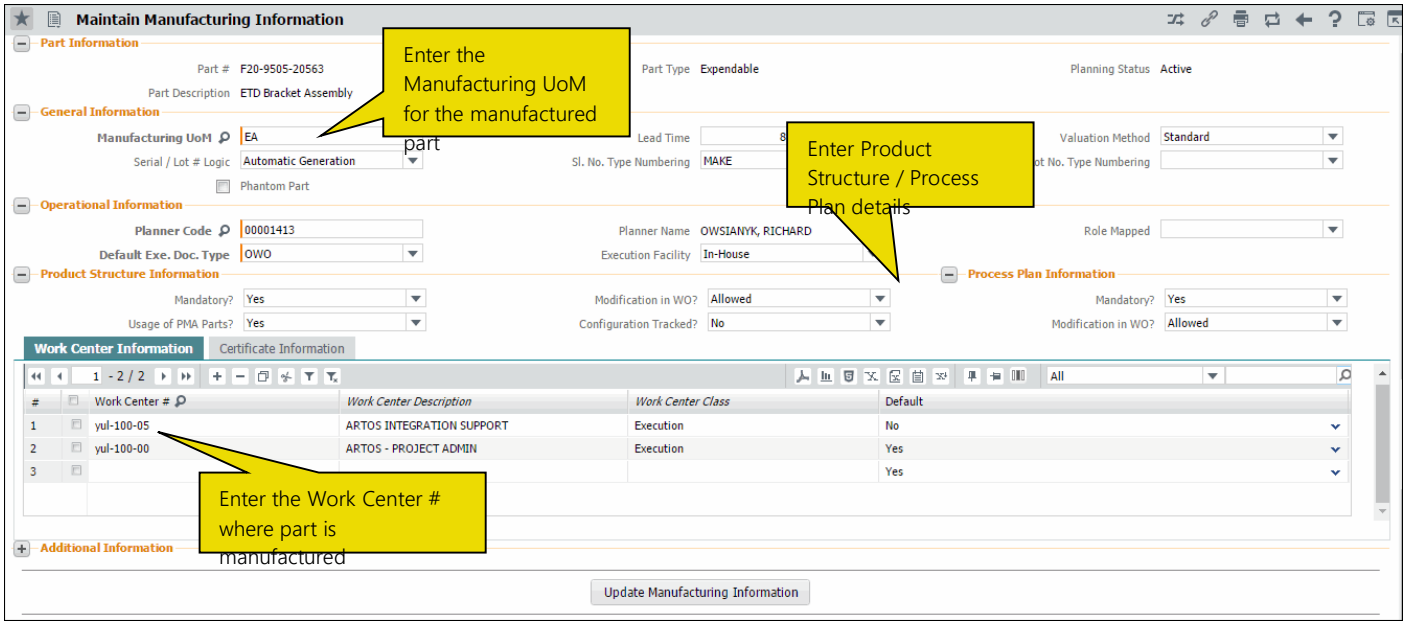

Figure 2.1 Defining part manufacturing information

2. In the **General Information** group box, enter the **Lead Time, Valuation Method** Figure 2.1 Defining part manufacturing information defined for the manufactured part.
3. Enter the **Planner Code** and the **Default Exe. Doc. Type** for part manufacture, in the **Operational Information** group box.
4. Specify the **Product Structure Information** and the **Process Plan Information**.
5. In the **Work Center Information** tab, enter the **Work Center #** where part is manufactured.
6. In the **Certificate Information** tab, enter the certificate details like **Certificate Type** defined for the part and **Certifying Authority.**
7. Select **Required?** as "Yes" or "No" to specify whether it is mandatory to issue certificate before closing the work order.
8. Click the **Update Manufacturing Information** pushbutton to update the manufacturing information for the part.

To proceed carry out the following:

- Select the **Manage Product Structure** link to define or update product structure for the part.
- Select the **Maintain Purchase Information** link to update purchase Information for the part.
- Select the **Maintain Sales Information** link to update sales Information for the part.
- Select the **Edit Part Main Information** link to modify the details of the part.
- Select the **Upload Documents** link to upload documents.

2.2 DEFINING QUICK CODES

This activity enables users to define quick codes such as Product Structure, Process Plan and Work Monitoring & Control. Typically, quick code types refer to specific attributes of entities for which users can define quick codes. Entities could be documents, processes or maintenance objects.

1. Select the **Manage Quick Code**s activity under the **Common Masters** business component. The **Manage Quick Code** page appears. *See Figure 2.2.*

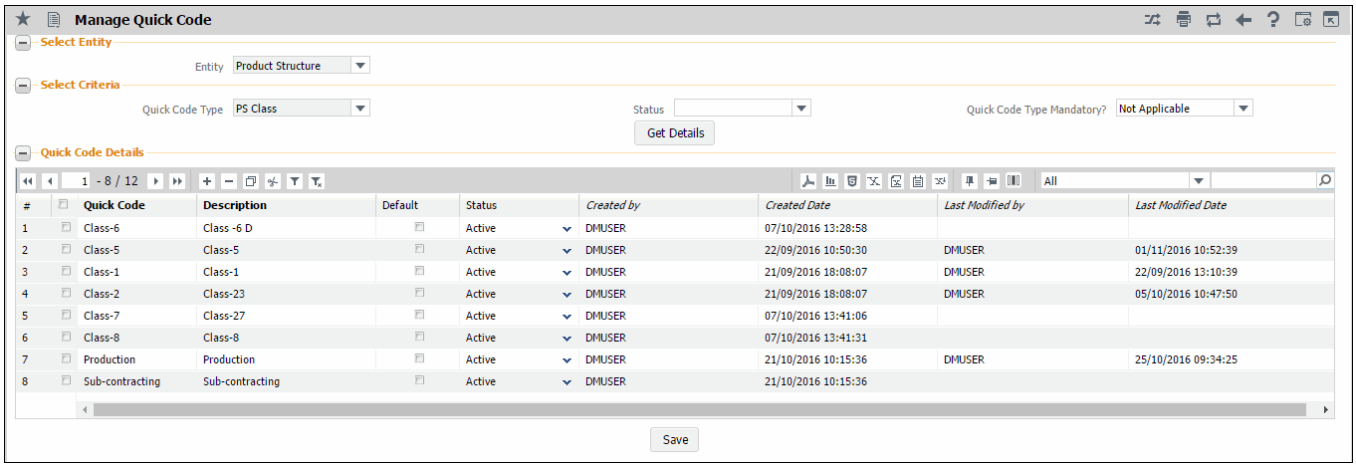

Figure 2.2 Defining quick codes

2. Use the **Entity** drop-down list box and select the entity for which the quick codes must be created. The drop-down list box displays the following: 'Product Structure', 'Work Monitoring and Control' and 'Process Plan'.
3. Use the **Quick Code Type** drop-down list box to select the type of quick code corresponding to the entity selected. You can define quick codes of following Quick Code Type corresponding to the entity:
    - Product Structure: "PS Class", "PS Category"
    - Work Monitoring and Control: "Process Status"
    - Process Plan: "PP Category"
4. Enter unique quick codes for the selected type, in the **Quick Code** fieldin the multiline.
5. Enter the **Description** for the quick code and select the **Status** of the quick code.
6. Click the **Save** pushbutton.

2.3 MANAGING PROCESS PLAN

For manufacturing a part, it is necessary to identify the tasks to process the required raw materials on different resources. The manufactured part will be obtained after all the required tasks have been performed in a predefined sequence. A process plan identifies the set of operations / tasks that need to be performed in sequence to manufacture a part. It is also referred to as routing information. Two types of Process plans can be defined: 'Standard' can be used against any part manufacturing. Another is specific, which will be defined for the specific Part #.

2.3.1 MANAGING PROCESS PLAN

The **Manage Process Plan** activity allows identifying a process plan to manufacture a part. While defining a process plan, if the task listed in the process plan does not exist in the Task Master, the system will create a new standard task in the Task Master in 'Authorized' status, while saving the process plan. You can also revise the process plan by adding / removing tasks.

Prerequisite: Task must be of operation type "Make" as defined in **Maintain Activated Tasks** activity of the **Maintenance Task** business component.

1. Select the **Manage Process Plan** activity under the **Process Plan** business component. The **Manage Process Plan** page appears. *See Figure 2.3.*

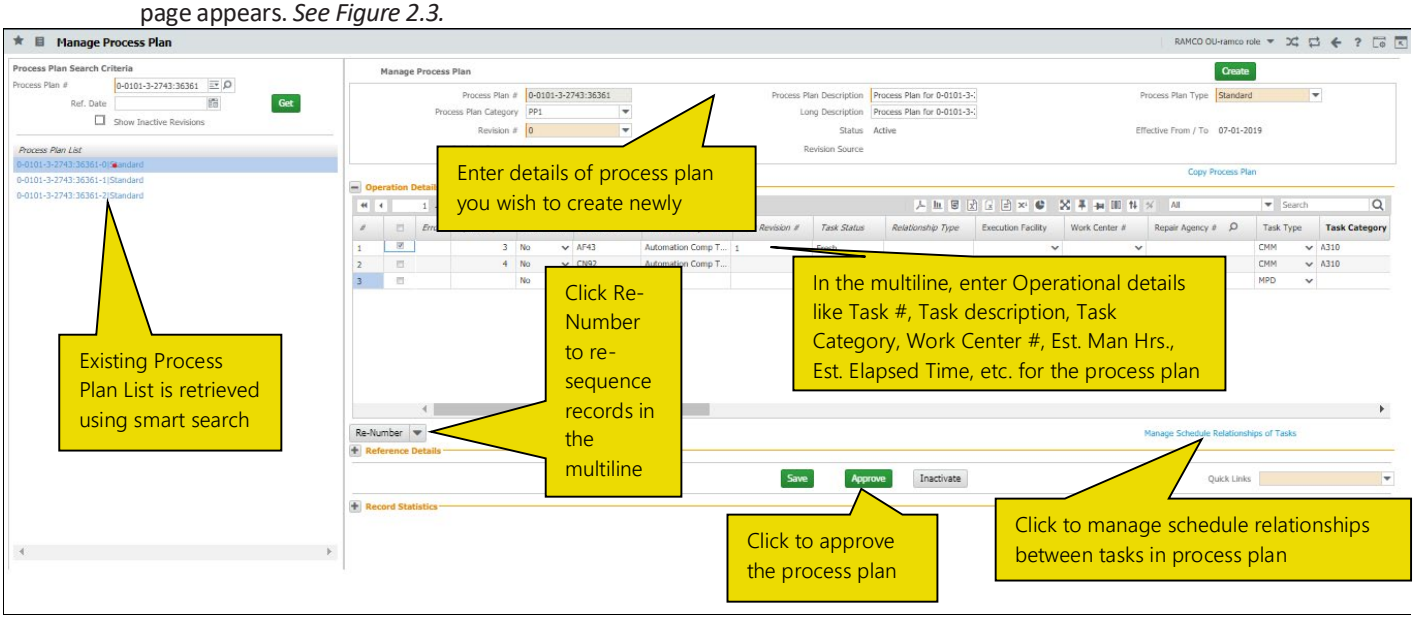

Figure 2.3 Managing process plan

Process Plan List

Existing process plan can be listed automatically by enabling a smart search for the Process Plan # in the **Process Plan List** section in the left pane. User can also search for the existing process plans in the Process Plan List.

Creating new process plan

In the **Manage Process Plan** group box,

2. Click the **Create** pushbutton to refresh the process plan details in the header and create a new process plan.
3. Enter the unique **Process Plan #** you wish to create, and enter the **Process Plan Description.**
4. Select the **Process Plan Type** as "Standard" or "Specific" and select the **Process Plan Category.**
5. Enter the date and time from which the process plan is effective, in the **Effective From** field.

In the "**Operational Details**" multiline,

6. Use the **New Task?** drop-down list box and select "Yes" or "No" to specify whether the task is new or already defined in task master.
7. Enter a valid **Task #** of Applicability other than "Aircraft" and enter the **Task Description**, if the task is already defined in the **Maintenance Task** business component and if the **New Task?** is selected as "No".

   *Note: If the Task is not available in the **Maintenance Task** business component and the **New Task ?** is selected as "Yes", then a new Task # will be created in 'Authorized' status in the **Maintenance Task** business component.*
8. Select the **Execution Facility, Work Center # & Repair Agency** for task execution**.**
9. Select the **Task Category** and **WBS Code** (Work Breakdown Structure) indicating the attributes defined for identifying the task**.**
10. Enter the **ATA #**, **Est. Man Hrs., Est. Elapsed Time** and **Time UoM** for completing the task.
11. Enter the average output quantity of the part manufactured by the task in the Standard Output Qty field.
12. Click the **Save** pushbutton to save the operational details against the task.
13. Click the Manage Schedule Relationships of Tasks link to update schedule relationship of the task with its predecessor.

Re-Number / Get Related Tasks button combo

14. Click the **Re-Number** option in the button combo to re-sequence the records in the multiline.

    *Note: The values in the 'Oper. Seq. #' in the multiline are multiplied with the value set in "Repair Scheme / Sub-Task Re- Sequence Multiplication Factor" control in the **Set Options** activity of the **Maintenance Task** business component and all the records are sorted / displayed in the ascending order of 'Oper. Seq. #'.*
15. Click the **Get Related Tasks** option in the button combo to retrieve the related tasks for the task in the multiline.

    Note: The Re-Number / Get Related Tasks button combo is not displayed if the process plan is newly created by clicking the "Create" pushbutton.

Approve process plan

16. Click the **Approve** pushbutton to approve the process plan details. You can enter **Approval Reference** or **Process Remarks**, if required**.**

    The process plan revision status is changed as "Active".

Inactivate process plan

17. Click the **Inactive** pushbutton to inactivate the process plan details.

    Note: The process plan can be inactivated, only when the Process Plan is in "Active" or "Fresh" status.

    The 'Approve' and 'Inactive' buttons are visible, if the process plan status is "Active" and "Fresh".

To proceed carry out the following:

In the **Quick Links** drop-down list box:

- Select the **Manage Task Relationship** link to define relation between the tasks.
- Select the **Manage Engineering Drawing** link to upload engineering drawings for tasks mentioned in the Process Plan.
- Select the **Edit Task Information** link to modify the task details.
- Select the **View Task Information** link to view the task details.

2.3.2 COPYING PROCESS PLAN

This pop-up screen allows the user to copy the operational (task) details of an existing process plan details to new process plan. When the user tries to create a new process plan, and if similar operational details already exist in the system, this pop-up screen can be used to copy the details.

1. Select the **Copy Process Plan** link in the **Manage Process Plan** page. The **Copy Process Plan** pop-up screen appears. *See Figure 2.4.*

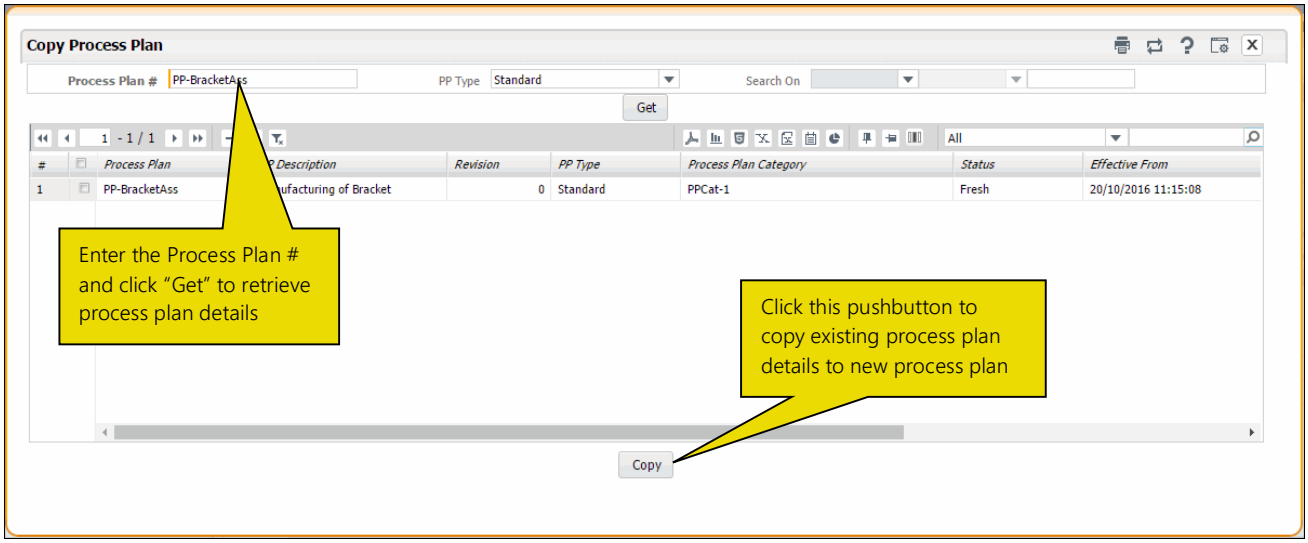

Figure 2.4 Copying Process Plan

2. Enter the **Process Plan #** from which you need to copy the process plan details.
3. Use the PP Type drop-down list box and select the process plan type as "Standard" or "Specific".
4. Use the **Search On** drop-down list and select the search value as "Part #" or "Process Plan Category" based on which you wish to retrieve the process plan details.
5. Click the **Get** pushbutton to retrieve process plans along with the revisions in the multiline.
6. Click the **Copy** pushbutton to copy the process plan details.

On selecting a record in the multiline and clicking "Copy" pushbutton, the system retrieves and displays Individual Operations details defined for the selected Process Plan #- Revision # in the "Operational Details" multiline in the **Manage Process Plan** page.

Managing schedule relationships of tasks

1. Select the Manage Schedule Relationships of Tasks link under the **Operation** Details multiline of the Manage Process Plan page. *See Figure 2.5.*

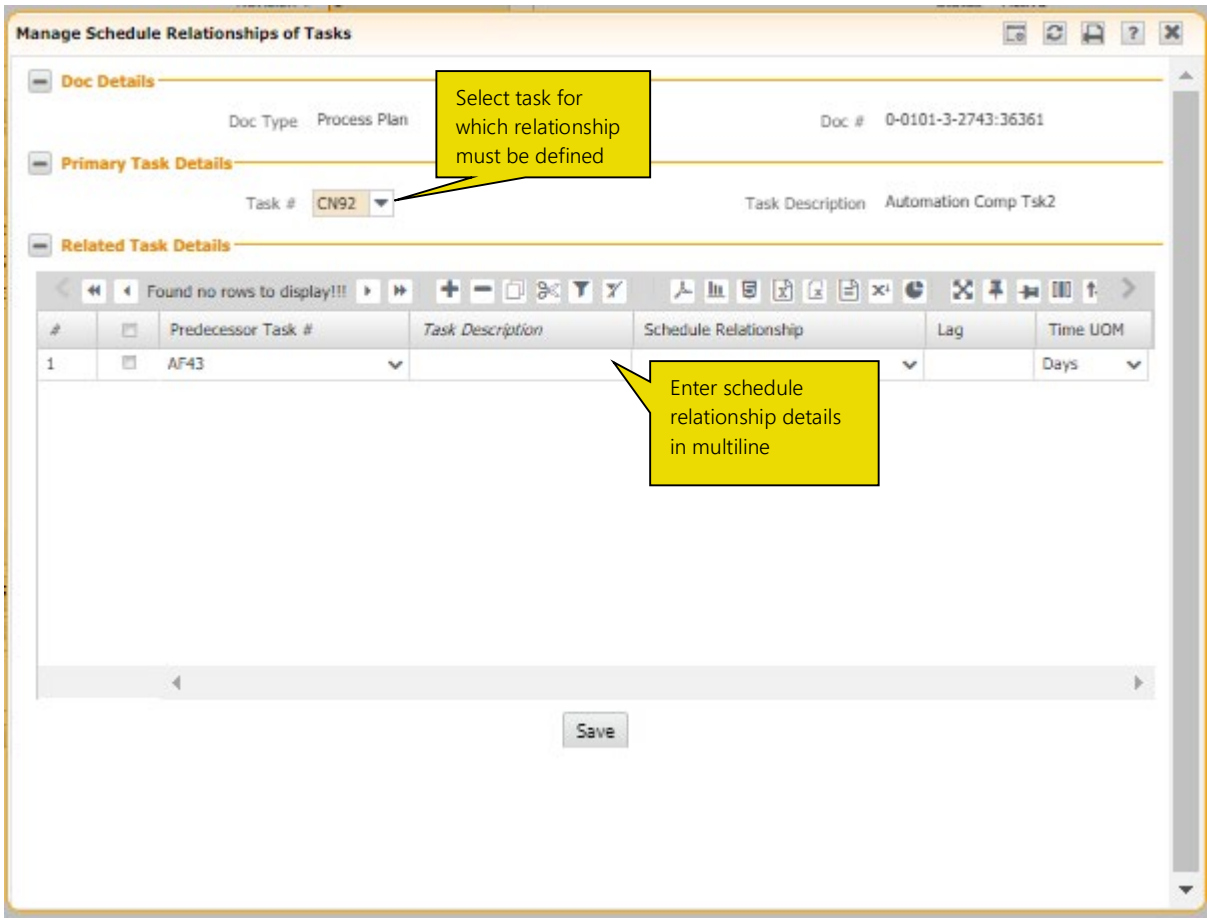

Figure 2.5 Revising process plan

2. Use the **Task #** drop-down list box to select the task for which you want to define schedule relationship in the **Primary Task Details** group box.
3. In the **Related Task Details** multiline, use the **Predecessor Task #** drop-down list box to select the predecessor task with which you want to define schedule relationship for the task.
4. Use the **Schedule Relationship** drop-down list box to select the schedule relationship to be set between the tsk and its predecessor task.
5. Enter the time interval between the execution of the predecessor task and the task in the **Lag** field.
6. Use the **Time UOM** drop-down list box to select the unit of measurement for the lag duration.
7. Click the **Save** pushbutton to save input data.

2.3.3 REVISING PROCESS PLAN

When the operations details of the process plan are modified, system displays the 'New Revision' popup and mandates the user to enter revision information like Effective from, Revision Source and Revision Remarks. The system saves the new revision details and generates a new revision for the process plan.

1. Select the **Save** pushbutton" in the **Manage Process Plan** page, when the PS Status is "Active" or "In-Active". The **New Revision** pop-up screen appears. *See Figure 2.6.*

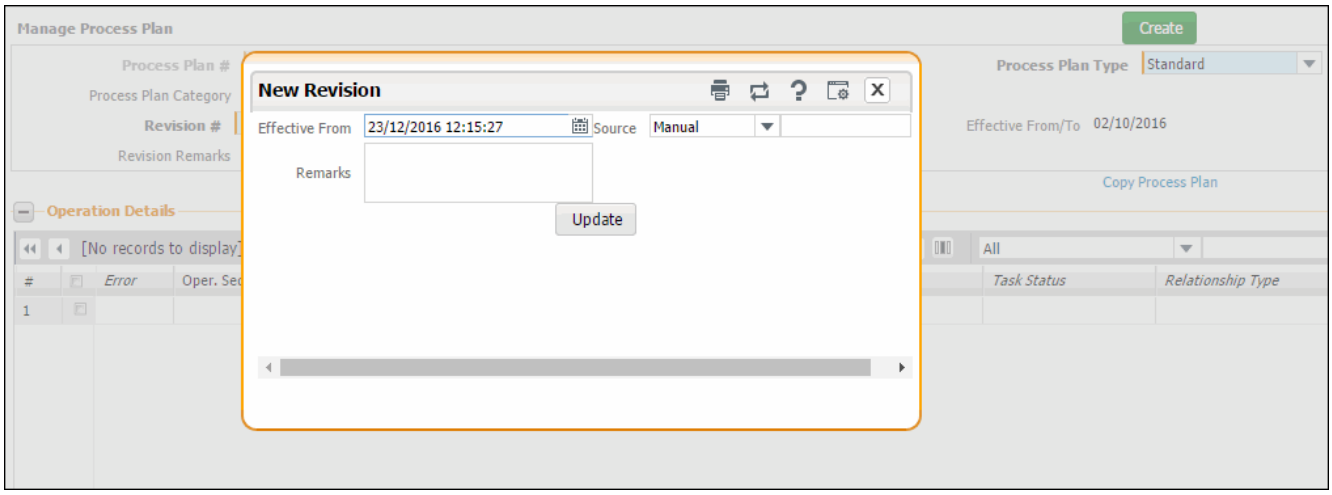

Figure 2.6 Revising process plan

2. Enter the **Effective From** date of the process plan revision.
3. Use the **Source** drop-down list box and select the source document for revision as “Manual” or “Engg. Change Order”. Enter the new source document number in the editable box provided alongside, if the source document type is selected as 'Engg. Change Order'.
4. Enter any **Remarks** related to the revision.
5. Click the **Update** pushbutton to update the revision details against the process plan.

2.4 MANAGING PRODUCT STRUCTURE

Product structures are used for the purpose of defining bills of materials of parts. The product structure is a single level of Bill Of Material (BOM), containing a parent and its immediate child. User can define Product Structures for parts at each level and integrate these to get the complete bill of materials.

The bill of material shows the level-by-level information of all constituent parts required to produce an end product. It is convenient to define one level of information for each part of bill of material as a product structure, i.e. constituent parts and its immediate level constituent parts. Whenever required, the bill of material information for a part can be obtained using the product structures.

Multiple Product Structures for the same part:

A Part can have more than one product structure due to various purposes. A company may have multiple work center facilities at different locations. The manufacturing capacities differ from location to location. For example, availability of materials at each location may lead to usage different parts to manufacture a particular part. The correct product structure is selected based on the validity of the product structure. Currently multiple product structures can be handled by using the concept of PS Class. A Part can have only one default product structure and multiple alternate product structures. Since a part can have multiple product structures, always the default product structure is to be picked up for manufacturing a Part or Work Order execution.

2.4.1 MANAGING PRODUCT STRUCTURE

The **Manage Product Structure** activity allows defining product structure for a part. You can create a product structure for a part, search the existing product structure along with the product structure class information and modify the product structure. You can also map constituent parts of the product structure to the individual tasks in the process plan. Engineering drawings can also be defined for the product structure / part / task.

You can perform the following using the activity:

- Create new product structure for a part
- Retrieve existing product structures
- Revise the existing product structure
- Map constituent parts of product structure to tasks in process plan
- Define engineering drawings for the for Product Structure / Part #
- Review Bill of Material (BoM) consisting of all the product structures along with their constituents

Prerequisites:

- Source of Part must be defined as “Make” in the **Maintian Planning Information** activity of the **Part Administration** business component.
- Part Manufacturing information must be defined in the **Maintain Planning Information** activity of the **Part Administration** business component, to activate the part, if Source of the part is “Make”.

1. Select the **Manage Product Structure** activity under the **Product Structure** business component. The **Manage Product Structure** page appears. *See Figure 2.7.*

Product Structure List

Existing process plan can be listed automatically by enabling a smart search for the Process Plan # in the **Product Structure List** section in the left pane. User can also search for the existing process plans in the Process Plan List.

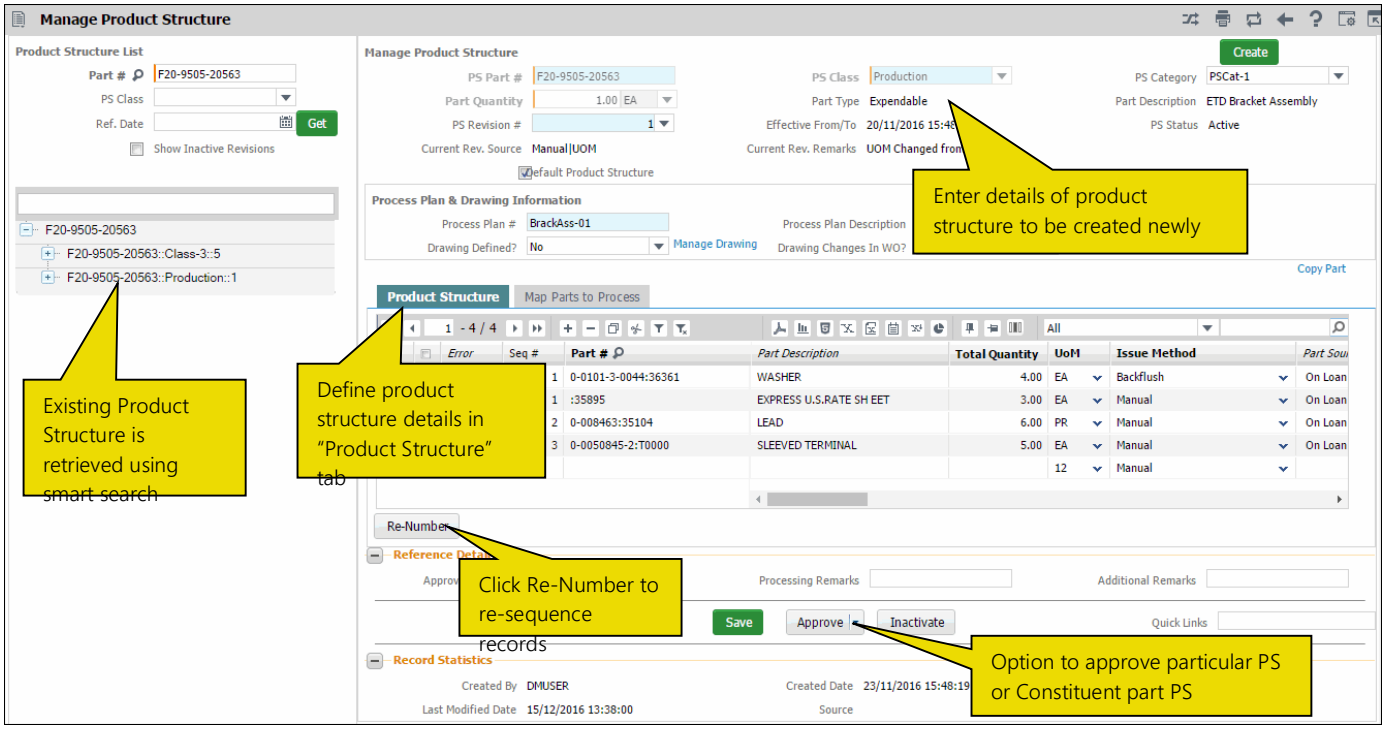

Figure 2.7 Managing product structure

Creating new product structure part

In the **Manage Product Structure** group box,

2. Click the **Create** pushbutton to refresh the product structure details in the header and create a new parent part.
3. Enter the unique Product Structure part in the **PS Part #** field and select the **PS Class**.
4. Enter the Part Quantity and **Effective From** date of the product structure.

In the **Process Plan and Drawing Information** group box,

5. Enter the **Process Plan #** mapped to the product structure part, PS Class and PS Revision combination.
6. Select "Yes" in the **Drawing Defined?** drop-down list box, if engineering drawing is defined for PS Part #. Else select "No".
7. Select the **Manage Engineering Drawing** link to define engineering drawing for the product or part.
8. Use the **Drawing Changes in WO** drop-down list and select "Allowed" or "Not Allowed" to indicate whether engineering drawing changes can be allowed in work order or not.
9. Select the **Product Structure** tab to update the constituent part details.
10. Select the **Map Parts to Process** tab to map the constituent parts to tasks.
11. Click the **Save** pushbutton to save the product structure details.

> *Note: On save, the status of the product structure is updated as "Fresh" for the newly created product structure.*

Approve product structure

- Click the **Approve** option in the button combo to approve the particular product structure.
- Click the **Approve Constituent Part Product Structure** option in the button to approve the constituents for which product structure is defined but status of product structure is “Fresh”.

Inactivate product structure

- Click the **Inactive** pushbutton to inactivate the product structure.

  Note: The part product structure and Revision # combination can be inactivated, when the revision of the product structure is in 'Active' or ‘Fresh’ status.

  Note: The “Approve” and “InActive” buttons are visible, if the PS Status is “Approved” and “Fresh”.

To proceed carry out the following:

- In the **Quick Links** drop-down list box, select the **Edit Part Main Information** or **View Part Main Information** link to modify or view the part details of PS Part #.

Defining product structure details

This tab allows you to define product structure for the part. The product structure consists of materials or component parts or Phantom Parts for a parent / manufactured part. Constituent parts information for these parts can be defined using this tab, which form the parent / manufactured Part. You can also revise the existing product structure by adding / removing few parts from the product structure. A phantom part can also be added as a constituent part in Product structure details.

1. Select the **Product Structure** tab in the **Manage Product Structure** page. *See Figure 2.7.*
2. Enter the constituent **Part #** of the product structure part.
3. Enter the **Total Quantity** of the part and the **UOM** for the part.
4. Select the **Issue Method** of the part as “Backflush”, “Manual”. The Issue method ‘Backflush’ items will not be available for planning Task – Part requirements.
5. Use the **Source Strategy** drop-down list and select “Inventory”, “Purchase” or “Make”. The Source Strategy will be helpful for planning Task - Part requirements.
6. Select the **PS Class**.
7. Click the **Re-Number** pushbutton to re-sequence the records in the multiline.

   Note: The system sorts all the records in the ascending order of 'Seq No' and renumbers the records in the multiples of '5'.

Mapping parts to process

This tab allows mapping the constituent parts of the product structure to the individual tasks in the process plan, while manufacturing the parent part.

1. Select the **Map Parts to Process** tab in the **Manage Product Structure** page. *See Figure 2.8.*

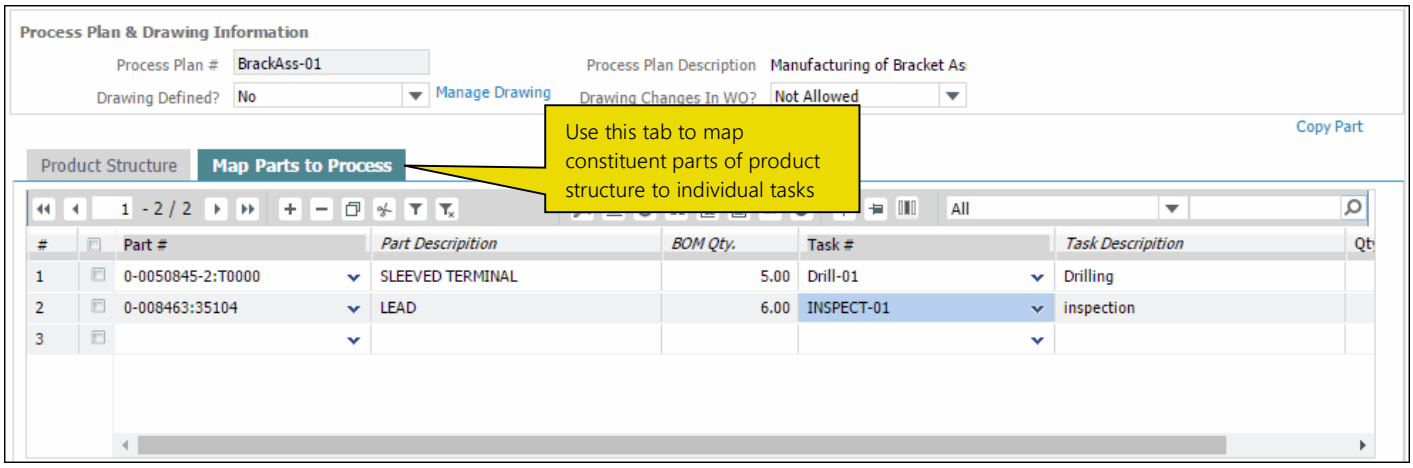

Figure 2.8 Mapping parts to process

2. Select the constituent **Part #** to mapped to the task in the process plan.
3. Select the **Task #** to which the part is mapped.
4. Enter the **Qty** of parts required for performing the task on the constituent part.

2.4.2 COPYING PRODUCT STRUCTURE

This pop-up screen allows the user to copy the existing product structure constituent details into new product structure. When the user tries to create a product structure and if similar product structure already exists in the system, user can use this pop-up screen to copy the product structure.

1. Select the **Copy Part** link in the "Manage Product Structure" page. The **Copy Product Structure** pop-up screen appears. *See Figure 2.9.*

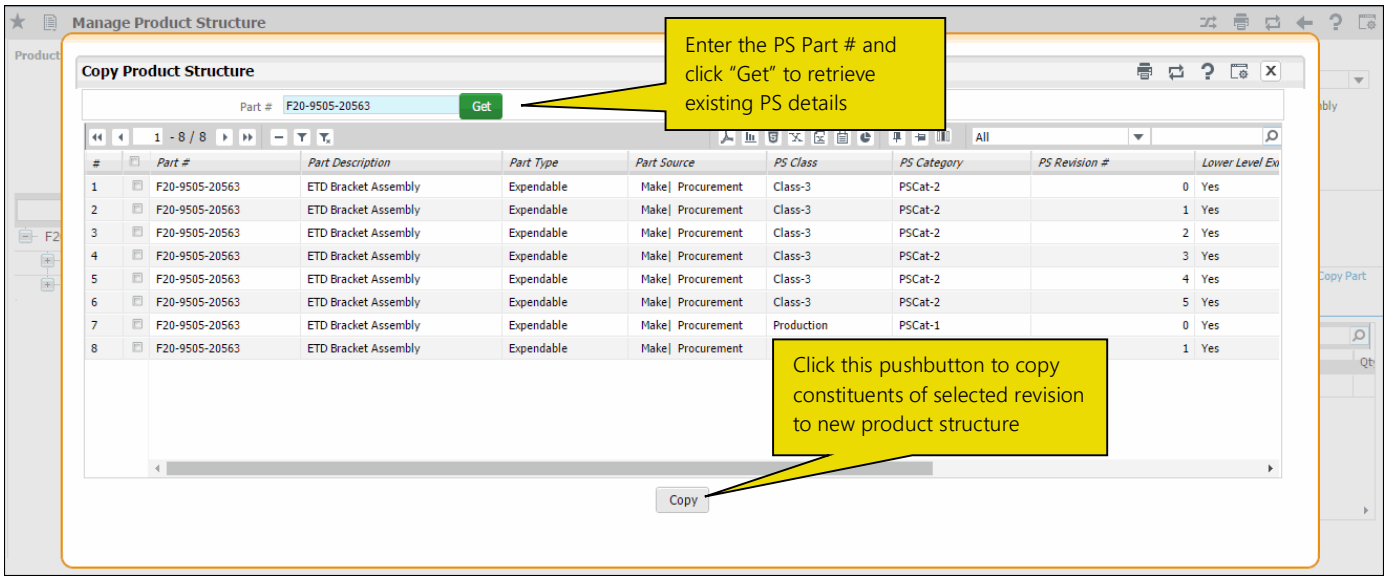

Figure 2.9 Copying product structure

2. Enter the Product Structure **Part #** from which you need to copy the details.
3. Click the **Get** pushbutton to retrieve existing product structure details along with the PS Class and Revision # in the multiline.
4. Click the **Copy** pushbutton to copy the constituents of selected revision into the new product structure.

2.4.3 UPDATING REVISION FOR PRODUCT STRUCTURE

When user tries to modify the product structure information by removing / replacing / adding any constituents in the existing product structure, it is required to update the new revision details. This pop-up screen is used to update the newly entered revision details against the product structure which is in "Approved" or "In-Active" status. The revision is incremented by '1' and the status is modified as "Fresh".

1. Select the **Save** pushbutton in the **Manage Product Structure** page, when the PS Status is "Approved" or "In-Active". The **New Revision** pop-up screen appears. *See Figure 2.10.*

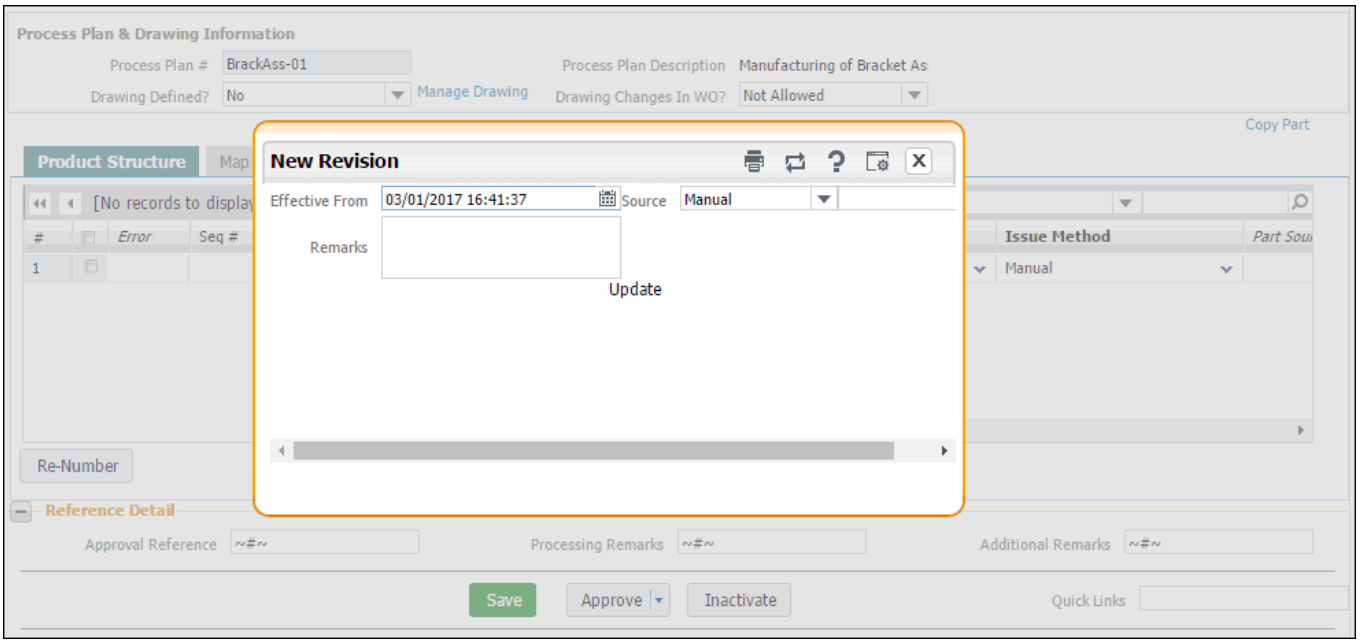

Figure 2.10 Revising product structure

2. Enter the **Effective From** field indicating the date from which the product structure revision is effective.
3. Use the **Source** drop-down list box and select the source document for revision as “Manual”.
4. Enter any **Remarks** related to the revision.
5. Click the **Update** pushbutton to update the revision details against the product structure.

2.4.4 VIEWING BILL OF MATERIALS

The Bill of Materials (BOM) consists of all the product structures of the parent part, along with the constituents of each product structure. The Bill of material displays the complete details of all the constituent parts, assemblies, sub-assemblies and raw materials that go into manufacture of the finished product along with the details of the quantities of each constituent part, in a hierarchical form.

Based on the single level product structure defined by the user, and the parent and child relationship, the system automatically builds up the multi-level bill of material. The user may view or print the multi-level bill of material along with the usage quantities of each of the constituent parts at any level.

Each BOM information can be shown in two views:

- ‘Normal View’, which will display all the constituent parts and subassemblies in the hierarchical manner including phantom parts.
- ‘Flattened View’, in which phantom parts will not be displayed; instead all the constituent parts available inside the phantom part will be rolled up to one level higher.

1. Select the **View BOM** link in the **Manage Product Structure** page. The **View Bill of Materials** page appears.
   See Figure 2.11.

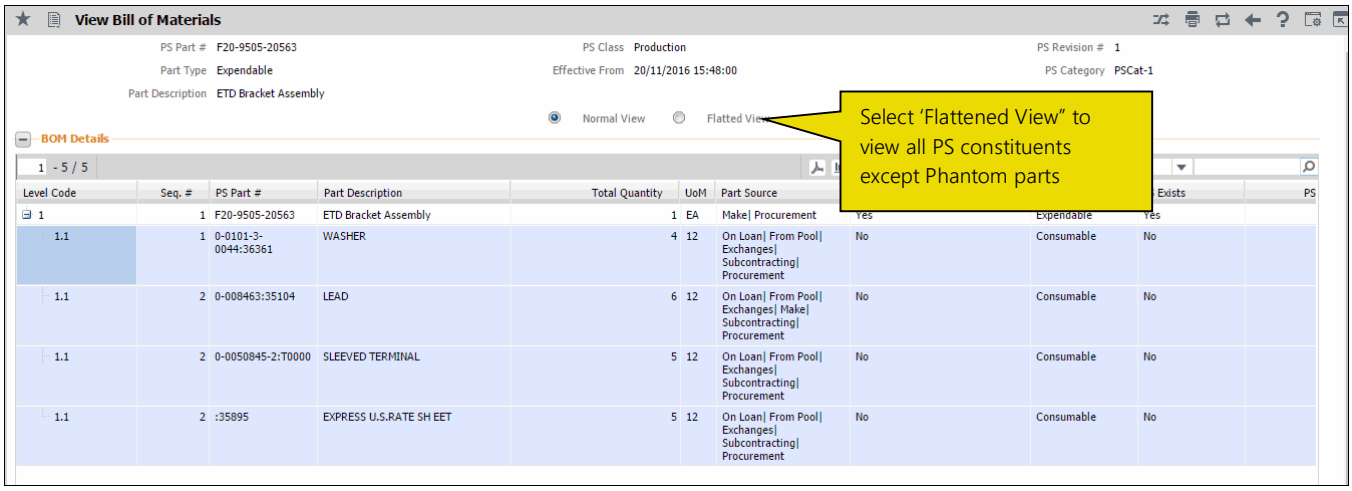

Figure 2.11 Viewing bill of materials

2. In the header, the system displays details like **PS Part #, PC Class, PS Revision, Part Type, Effective From / To, PS Category** and **Part Description.**

3. Select one of the following radio buttons:
   - 'Normal View' - Select this radio button to display all the product structure and their constituents in a hierarchical form. Refer below 'Example'.
   - 'Flattened View' - If you select this radio button, all the product structure and their constituents are displayed in hierarchical form, except the Phantom parts. Refer below 'Example'.

Example: If 'P2' & 'P3' are constituent parts to 'P1' and if 'P4' and 'P5' are constituent parts to 'P2' and also 'P2' is a Phantom Part, the product structure is displayed in the following hierarchy:

Normal View:

P1

P2

P4

P5

P3

Flattened View:

P1

P4

P5

P3

Note: Phantom part 'P2' is not displayed in flattened view and its constituents are displayed in the next higher level.

4. In **BOM Details** multiline, the system displays the BOM details like **Level Code, Seq. #, PS Part #, Part Description, Total Quantity, UOM, Part Source, Source Strategy, Part Type, PS Exists, PS Revision, Effective From, Effective To** and **Remarks.**

2.4.5 MANAGING ENGINEERING DRAWINGS

Engineering drawings are a complete set of drawings that detail the manufacturing and assembly of products. It is an authorized document to produce the component in the shop floor. It furnishes all dimensions, limits and special finishing processes. In addition to the materials used, it should also mention the number of parts that are required for making the assembled unit.

Engineering drawings can be defined for the Product structure Part #, Constituent Parts defined under Product Structure and also Tasks available in the Process Plan #. These Engg. Drawings can be managed at 'Library' or 'Direct'. Library documents are controlled documents, which will be revision controlled and managed through **Library Management** business process. If the user does not have access to library management, then user can save the drawings directly.

- Engineering drawing for product structure will list all the drawings defined for the product structure part.
- Engineering drawing defined for the constituent part # in the product structure, will be part drawings.
- Engineering drawings for tasks participating in the process plan depict how to perform a task / operation. Engineering drawing for task can defined by selecting a task in the "Manage Process Plan" screen

1. Select the **Manage Engineering Drawing** link in the **Manage Product Structure** page. The **Manage Engineering Drawings** page appears. *See Figure 2.12.*

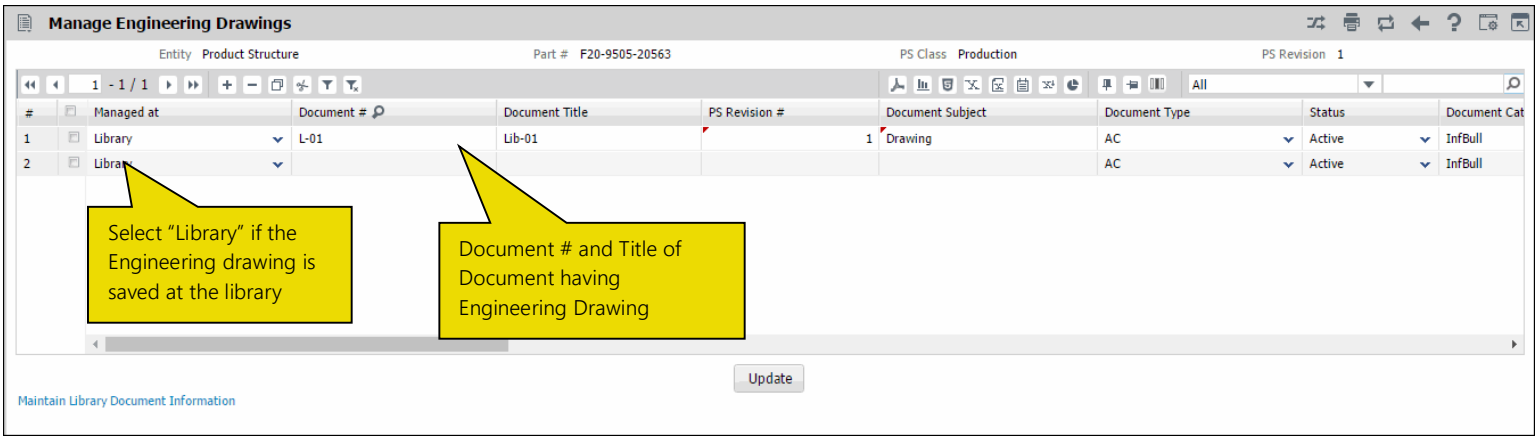

Figure 2.12 Managing Engineering Drawings

> *Note: The screen displays the following details in the header based on the context with which the "Manage Engineering Drawings" screen is launched.*
>
> - *Product Structure context – Entity, Part #, PS Class, PS Revision are displayed*
> - *Part context – Entity, Part # are displayed*
> - *Task - Entity, Task # are displayed*

2. In the multiline, use the **Managed at** drop-down list and select "Library" if the engineering drawing is saved at the library. Else select "Direct". The system lists the value "Library" only when there exists a Component Interaction Model (CIM) interaction with the "Library" business component.
3. Enter the **Document #** having an engineering drawing, and the **Document Title**.
4. Enter the other document details like **Revision #, Document Subject, Document Type, Status, Document Category, Effective From** and **Effective To** date of the document, **No. of Sheets**, **Drawing Location**, etc. System will not allow user to modify the Document details for Library documents.
5. Click the **Update** pushbutton to update the drawing details for the selected product structure / part / task.

To proceed carry out the following:

- Select the **Maintain Library Document Information** link to maintain the document details.

> *Refer to "Library Operations" Online Help for more details.*

SHOP PLANNING AND EXECUTION

Shop Planning & Execution sub process aids in planning task-part requirements for the manufacturing job, execution of tasks and reviewing / managing the certificate requirements for the Work Order. These are individually managed though **Shop Work Order** and **Work Monitoring and Control** business components.

- **Shop Planning** facilitates the production planner to plan his part requirements for the manufacturing job and also plans his material requirements based on the Planned Start date of the task. A facility to capture manufacturing details and certificate details is also provided.
- **Shop Execution** provides the facility to execute the tasks, review / manage certificate requirements for the Work Order and provides a list of all the certificates that need to be printed for the Work Order #. Also it facilitates to return the manufactured parts to respective return warehouses.

3.1 UPDATING / SPLITTING MAIN CORES AND COVERAGE

You can attach additional parts / serial numbers to the main core. Also you can split work orders created in the Plan Work Order page based on their quantity. A new SWO # will be generated for the split quantity in the multiline as the main core quantity. Whenever Work order is generated for the material request from **Plan Material** screen, MR coverage information is updated in **Update / Split Main Cores and Coverage Information** page. Also user can manually update / modify the MR coverage information using this screen.

1. Select the **Update / Split Main Cores** link in the **Plan Work Order** page of the **Shop Work Order** business component. The **Update / Split Main Cores and Coverage Information** page appears. *See Figure 3.1.*

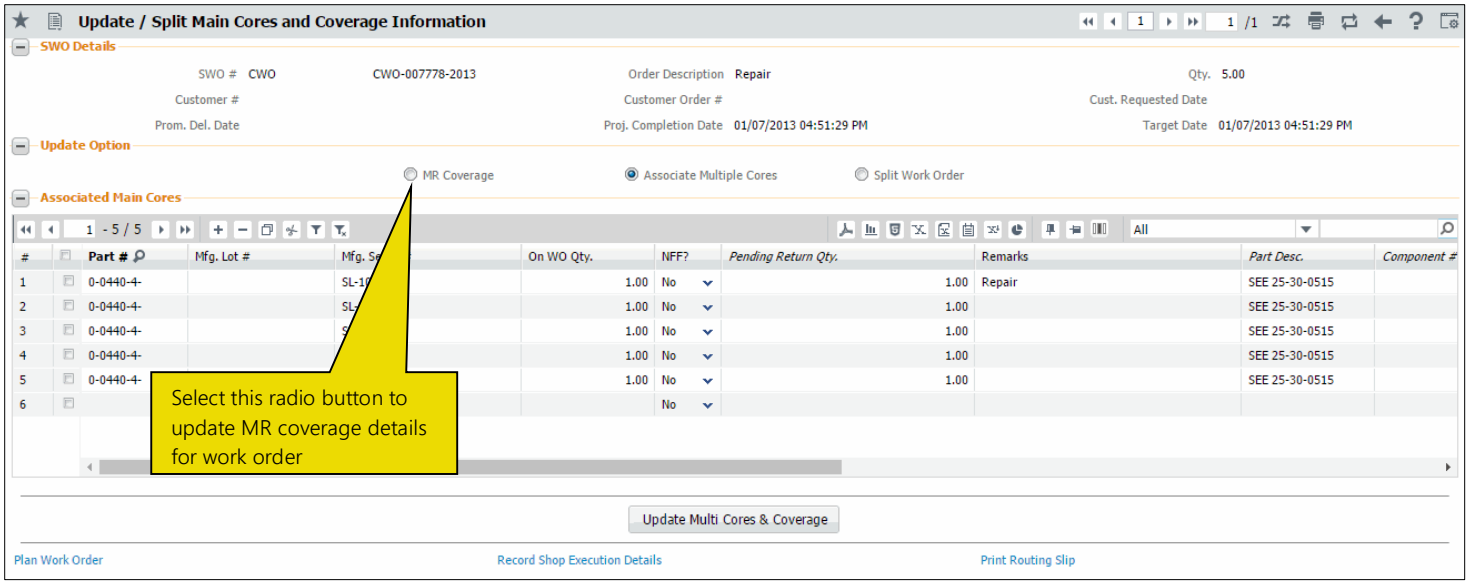

Figure 3.1 Updating / splitting cores and coverage

2. In the **Update Option** group box, select the **MR Coverage** radio button to display MR coverage details associated with the shop work order.

   Note: This radio button is enabled only for shop work orders of Job Type 'Make'.

3. Select the **Associate Multiple Cores** radio button to attach multiple cores to the main core.
4. Select the **Split Work Order** radio button to split work order based on its quantity.
5. In the **Associated Main Cores** multiline, update the relevant details based on the radio button selection.
6. Click the **Update Multiple Cores & Coverage** pushbutton to update MR coverage details / associate multiple cores / split work order.

3.2 PLANNING MATERIAL

You can view the list of all the unsatisfied material requests, total quantity of the requested parts inclusive of the alternate parts that are available for allocation, and also the warehouse from where the part can be transferred. While enabling to plan material requirements, the **Plan Material** screen provides the ability to create make work order for an existing material request for part manufacture.

This page also provides you with the option of transferring the stock or raising a purchase order to satisfy the material request:

1. Select the **Plan Material** activity in the **Stock Demand Management** business component. The **Manufacturing Data** page appears. *See Figure 3.2.*

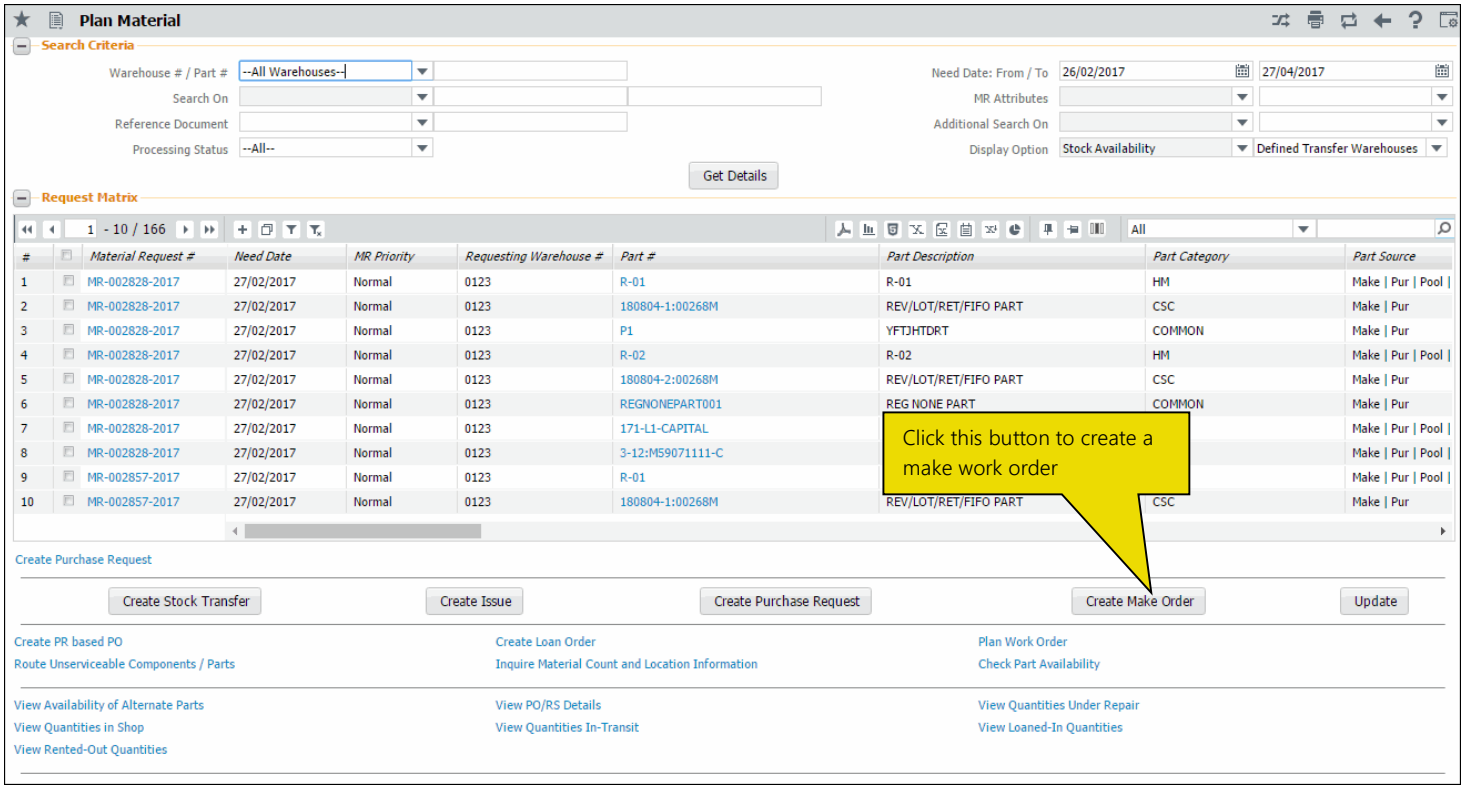

Figure 3.2 Planning Material

2. Enter the **Search Criteria** and click the **Get Details** pushbutton to retrieve the existing material request.
3. Enter the quantity of material which will be processed in the **Process Qty** field.
4. Click the **Create Stock Transfer** pushbutton to transfer the stock.
5. Click the **Create Issue** pushbutton to create a maintenance issue document for the part and the required quantity of material.
6. Click the **Create Purchase Request** pushbutton to create a purchase request for the stock.
7. Click the **Create Make Order** pushbutton to create a shop work order of Job Type 'Make'.

   You can create a Make work order only if Source is 'Make' and Planning Status is 'Active' for the part'.

8. Click the **Update** pushbutton to update the details pertaining to the selected material request.

3.3 MANUFACTURING DATA

Make Work order can be created from the **Plan Material** screen or user can directly create the Work order from the **Plan Work Order** activity of the **Shop Work Order** business component. As part of manufacturing changes, the **Manufacturing Data** screen has been added in the **Plan Work Order** screen, which captures the Product Structure details, Process Plan details and Engg. Drawing information that are required for manufacturing a part. These details can be saved and modified before releasing the work order. User can also retrieve the latest manufacturing information for the part and given date.

1. Select the **Manufacturing Data** link in the **Plan Work Order** page or **Record Shop Execution Details** page of the **Shop Work Order** business component. The **Manufacturing Data** page appears. *See Figure 3.3.*

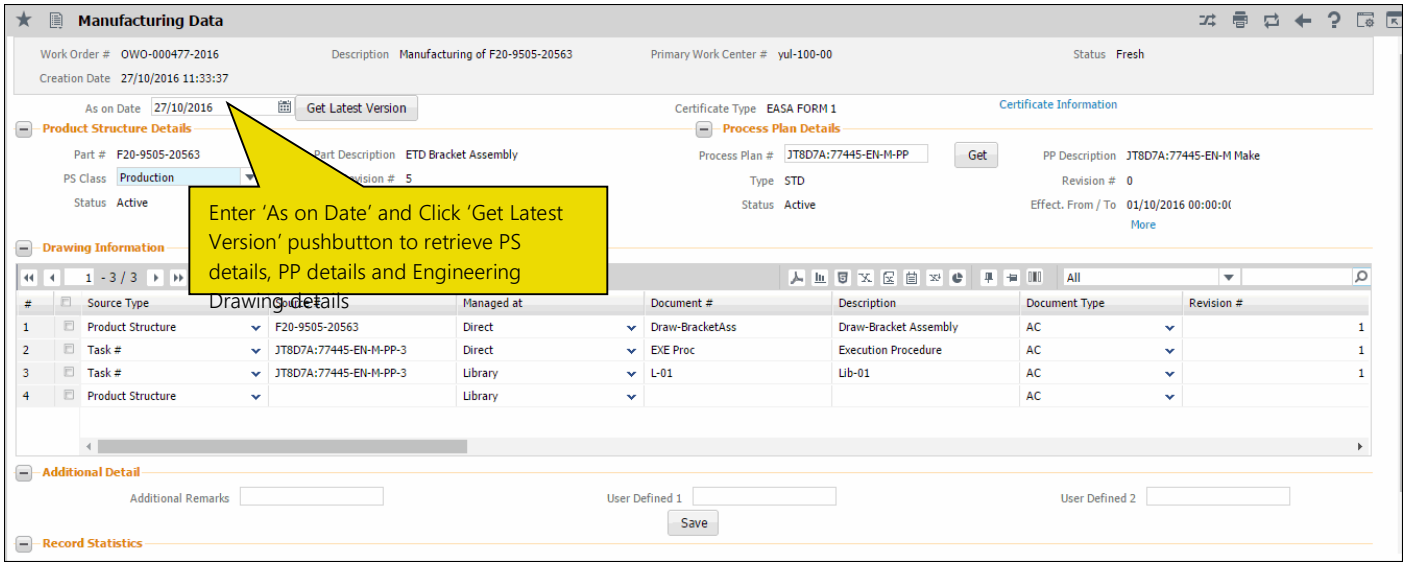

Figure 3.3 Manufacturing Data

2. Enter the **As on Date** and click the **Get Latest Version** pushbutton to retrieve the latest active revision of product structure details, process plan details, engineering drawing details and certificate details for the date specified.
3. The **Product Structure Details** section displays default product structure defined in **Manage Product Structure** screen. User can change the PS Class, if multiple product structures are available for the manufacturing part. This information will not be allowed to be modified once the Work Order is released for execution.
4. The **Process Plan Details** section displays process plan # mapped to the default product structure. If user changes the product structure by modifying the PS class, then process plan mapped to the new product structure will be copied. This information will not be allowed to be modified once the Work Order is released for execution.
5. The **Drawing Information** multiline lists all the drawings defined for PS Part #, its constituent parts and process plan tasks in the **Manage Engineering Drawings** screen. User can update the drawing information even if the work order is released for execution.
6. Select the **Source Type** as "Others" to manually add any additional drawings against specific work order.

   *Note: Modifications in Drawing details will be allowed only if "Drawing changes in WO ?" is set as "Allowed" for the selected product structure in **Manage Product Structure** screen under **Product Structure** business component.*

7. Click the **Save** pushbutton to save the manufacturing details.

3.4 CERTIFICATE INFORMATION

The **Certificate Information** screen captures the Certificate Information that needs to be issued after manufacturing the parts. Certificates that are added against Part # in the Part Manufacturing information will be copied automatically in the **Certificate information** screen. User can also add new certificate information in this screen. System will mandate the user to issue all the mandatory certificates before closure of work order.

1. Select the **Certificate Information** link in the **Manufacturing Data** page, **Plan Work Order** page or **Record Shop Execution Details** page of **Shop Work Order** business component. The **Certificate Information** page appears. *See Figure 3.4.*

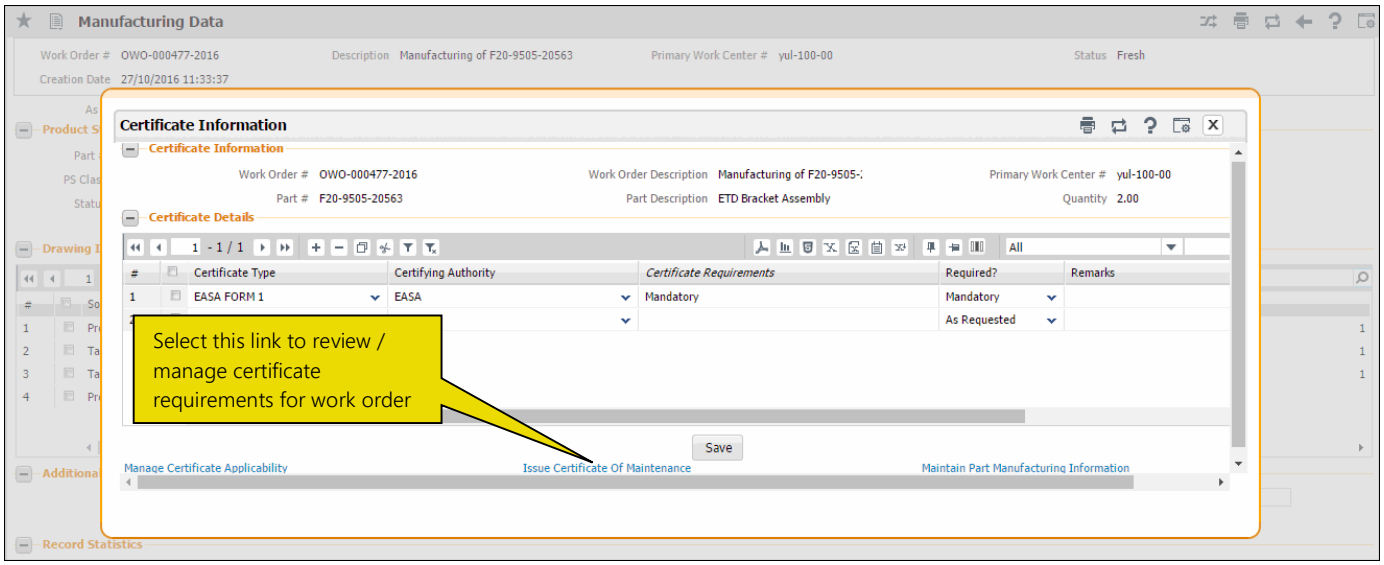

Figure 3.4 Certificate Information

2. The details of the work order and part for which certificate is to be issued are displayed in the header.
3. The **Certificate Details** multiline displays the certificate details of the part.
4. Select **Certificate Type** and **Certificate Authority** in the multiline to add new certificates for the part.
5. Click the **Save** pushbutton to save the certificate details.

To proceed carry out the following:

- Select the **Manage Certificate Applicability** link to define applicability for certificates.
- Select the **Issue Certificate Of Maintenance** link to issue certificates for the part.
- Select the **Maintain Part Manufacturing Information** link to define manufacturing information for the part.

3.5 REVIEWING MATERIAL REQUIREMENTS

The **Review / Plan Material Requirements** under the **Work Monitoring and Control** business component aids production planner to plan the Task-Part requirements for the manufacturing job. It also aids planner to plan materials based on the Planned Start date of the Task. This screen aims to plan his requirements effectively to complete the manufacturing job within stipulated timelines.

The system also aids the planner by providing the Recommended Action for the material requirements and also displays the Proposed Order Date for the planner based on the lead times, which will help him to avoid stock out and overstocking of the inventory. The screen lists entire Task-Part Requirements and also helps generate the Source Documents for the material requirements.

1. Select the **Review / Plan Material Requirements** activity under **Work Monitoring and Control** business component. The **Review Material Requirements** page appears. *See Figure 3.5.*

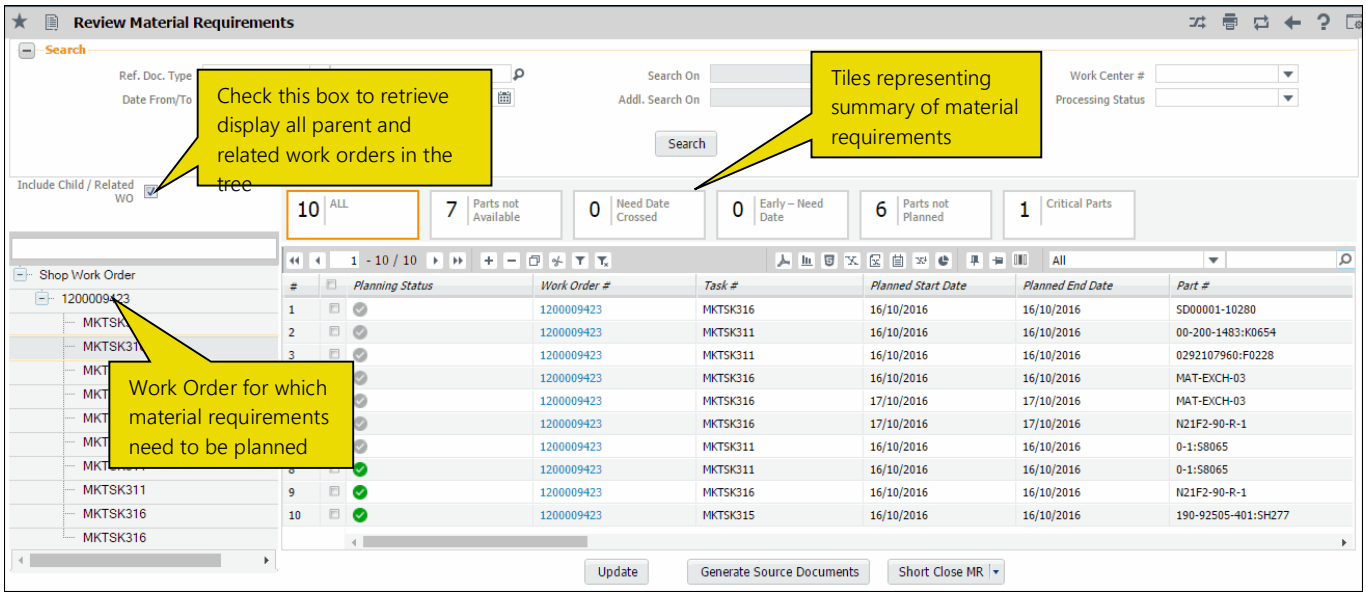

Figure 3.5 Reviewing material requirements

2. Enter the search criteria and click **Search** pushbutton to retrieve the Work Orders in a tree, for which planner has to plan the Material requirements.
3. The tree will display the distinction between multiple work orders. If the related work order is created because of the part requirements of the parent work order, then the related work order will be listed as a hierarchy list in the tree.
4. Check the Include **Child / Related WO** check box to display all the parent and related work orders in the tree that were created as part of material requirements.
5. Click on the Work Order # / Task # in the tree to retrieve Task-Part requirements in the multiline based on the selection of the check box.
6. The system displays following tiles which provide the summary of materials requirements.
    a. All – Indicates that all parts are required to complete work order.
    b. Parts Not Available - Parts that are not available in the stock will be displayed in this Tile.
    c. Need Date Crossed – Parts whose If the Source Document Need Date is later than the Task Start Date of the Work Order.
    d. Earlier - Need Date - if the parts are available before the planned Start Date of the Task in the Work Order.
    e. Part Not Planned: If the material requirements are not planned for the Tasks #.

f. Critical Parts: If the material requirements are not planned even after the Proposed Order date.

✍ *Note: Proposed Order date will be computed and displayed based on the Lead Times for Procurement or Manufacturing. i.e. If the Part Source Action is set as Make, then Proposed Order Date will be computed as Tasks Planned Start Date – Mfg. lead Time. For the Source Action 'Purchase', then Proposed Order Date will be Task Planned Start Date – Procure Lead Time.*

7. Click on the individual tile to retrieve the corresponding material requirements in the multiline.
8. In the multiline, select the **Source Action** as "Inventory", "Purchase" or "Make" to generate the respective source document to enable the user to plan the part requirements. Enter any **Processing Remarks** related to the source document.
9. Click the **Update** pushbutton to update the Source Action and Processing Remarks for the Task-Part requirements.
10. Click the **Generate Source Documents** pushbutton to generate the respective source document.

✍ *Note: Material Request # is generated for the part, if planning is not done for the part.*

✍ *If **Recommended Action** for a Part is 'Inventory', Issue Document # will be generated as a source document, if part is available in warehouse with required unallocated quantity.*

✍ *Recommend Action for a part is 'Purchase', Purchase Request # will be generated as source document.*

✍ *Recommended Action for part is 'Make', Make Work Order # is generated.*

✍ *if the parts are getting delayed for the source document, then respective source document will be short closed and the same part is eligible for re-planning*

11. Click one of the following buttons in the button combo:
    - **Short Close MR** to short close the MR generated for the part.
    - **Cancel Work Order** to cancel the existing work order generated for part requirement.
    - **Shortclose Purchase Request** to short close the existing Purchase request for the part.

3.6 REVIEWING / MANAGING CERTIFICATES

This screen allows you to review or manage the certificate requirements for the Work Order and also the list all the certificates that need to be printed for the Work Order #. All the certificates that are required to be issued against each Part or Part – Serial / Lot combination are listed in the screen. Existing certificates will be eligible for reprint and new certificates will be eligible for new certificate creation. User can issue "Print Id tag", "Certificate of Maintenance", "Certificate of conformity" and "Certificate of Calibration" from this screen. Certificates can be issued only if the work order is completed or closed.

1. Select the **Issue Certificate of Maintenance** link in the **Certificate Information** page in the **Shop Work Order** business component. The **Manage / Review Certificates** page appears. *See Figure 3.6.*

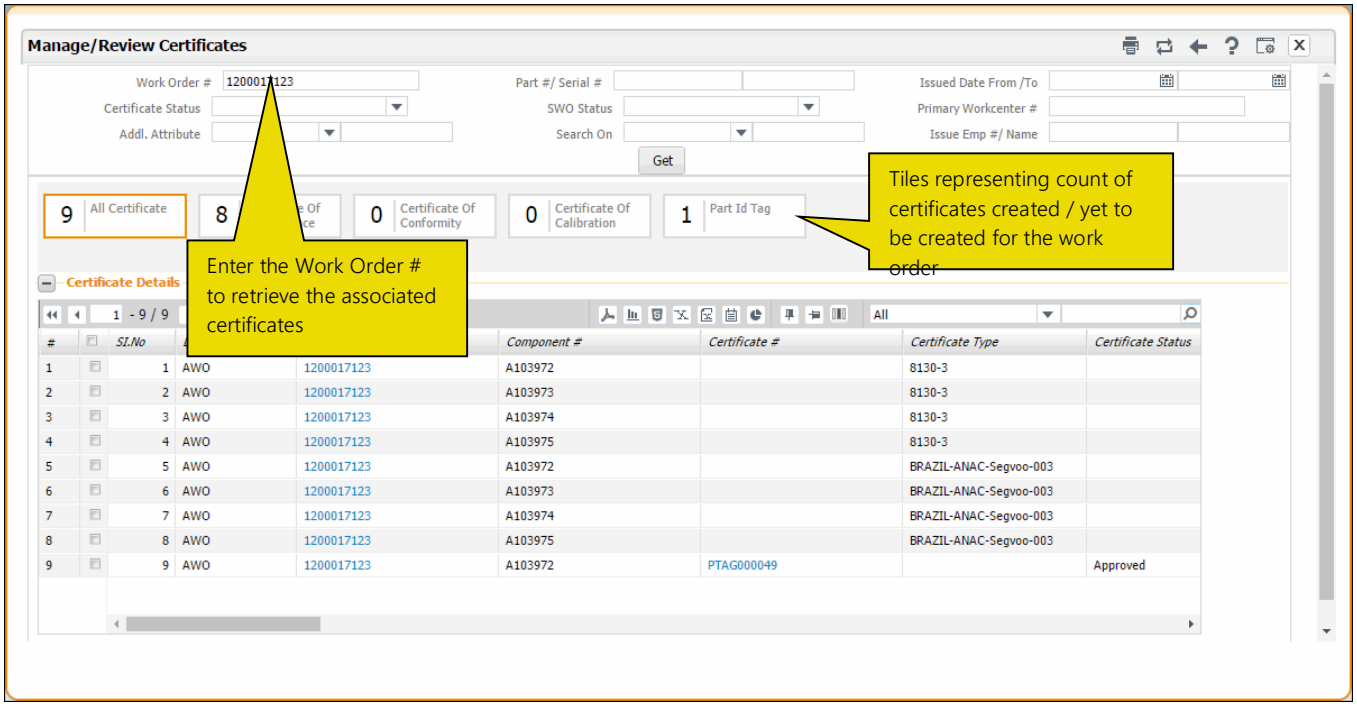

Figure 3.6 Reviewing / managing certificates

2. Enter the **Work Order #** and other Search Criteria.
3. Click the **Get** pushbutton to retrieve the certificate requirements of different type of certificates associated with selected work order document.
4. The system displays the count of certificates that are created or yet to be created in different tiles for the given Search Criteria. On clicking each tile, the system retrieves the corresponding certificate details in the multiline. The following tiles are displayed:
    a. All Certificates
    b. Certificate of Maintenance (COM)
    c. Certificate of Conformity (COC)
    d. Certificate of Calibration (Co Calib)
    e. Part ID Tag

    Note: The system lists certificate requirements in the multiline based on the option 'Issue distinct COM Report against individual Certificate Types' defined for the Entity Type 'Shop Work Order' and Entity 'All Work Order'.

3.7 SHOP EXECUTION

Shop Execution provides the facility to execute the tasks, review / manage certificate requirements for the Work Order, provide a list of all the certificates that need to be printed for the Work Order #. Also it facilitates to return the manufactured parts to respective return warehouses.

Shop Execution supports the following process as part of manufacturing changes in addition to managing certificate requirements:

- Execution of manufacturing jobs for components in the shops
- Record execution details for the Process Plan tasks, with Mechanic / Inspector / RII sign-off
- MR Coverage information will be automatically updated in the Work Order, when the Work Order is set from the **Plan Materials** screen.
- MR Coverage information for a Work Order can be modified using **Update / Split Core and Coverage information** screen. MR coverage information will be allowed to modified only for the Make Work orders.
- Update / Split core - Provision to split the scrapped Parts or Part - Serial numbers from the work order to scrap the respective units. Also user can split Unserviceable parts from the work order to move to different work center for additional workscope.
- System will automatically assigns the Mfr. Serial #/Mfr. Lot # for the manufactured parts while release of make Work Order.
- Estimation of work order
- Manufactured parts can be returned to the respective Serviceable return warehouse/ workcenter based on the MR coverage.
    - If the Make Work Order is a Parent Work Order, then the return should be created manually using **Record Part Consumption and Return** screen. Once the Return is confirmed then the same part will be issued against the Originating MR.
    - If the Make Work Order is a Related Work Order, then the return will be created and confirmed automatically. Also parts will be issued back to the MR to move the parts to respective Work Center#.
- Returning of Manufactured parts will be issued only to the originating MR only. The same will not be issued to any other MR.
- Supports third-party subcontracting of make parts through repair order.

Refer to **Component Maintenance** User Guide for more details on Shop Execution.

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