

ห้องสมุดคณะเทคโนโลยีสารสนเทศ สจธ.

# การจับคู่อุปสงค์และอุปทานของโรงงานผลิตชิ้นส่วนอิเล็กทรอนิกส์

## Demand - Supply Matching in Electronic Manufacturing

โดย

นางสาว จินทนา อินทร์สงคราม

รหัส 42067230

อาจารย์ที่ปรึกษา

รศ.ดร.วิเชียร เปรมชัยสวัสดิ์

วัน เดือน ปี..... 1 0 ๒๕๕0  
เลขทะเบียน..... 02811  
เลขเรียกหนังสือ..... วท: ๑486ก 2543  
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ภาคเรียนที่ 2 ปีการศึกษา 2543

คณะเทคโนโลยีสารสนเทศ

สถาบันเทคโนโลยีพระจอมเกล้าเจ้าคุณทหารลาดกระบัง

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ชื่อหัวข้อ	การจับคู่อุปสงค์และอุปทานของโรงงานผลิตชิ้นส่วนอิเล็กทรอนิกส์
นักศึกษา	นางสาว จินทนา อินทร์สงคราม
อาจารย์ที่ปรึกษา	รศ.ดร.วิเชียร เปรมชัยสวัสดิ์
ระดับการศึกษา	วิทยาศาสตร์มหาบัณฑิต สาขาวิชาเทคโนโลยีสารสนเทศ
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### บทคัดย่อ

การจับคู่อุปสงค์และอุปทานของโรงงานผลิตชิ้นส่วนอิเล็กทรอนิกส์ เป็นวิธีการหรือเครื่องมือตัวหนึ่งที่ช่วยให้ธุรกิจดำเนินไปได้อย่างต่อเนื่องในสถานการณ์การแข่งขันที่มีอยู่สูงของตลาดชิ้นส่วนอิเล็กทรอนิกส์ ประกอบกับการพัฒนาที่ก้าวหน้าไปอย่างรวดเร็วในผลิตภัณฑ์ ประเภทนี้ การจับคู่อุปสงค์และอุปทาน เป็นการรับรองกับลูกค้าได้ในระดับหนึ่งว่าจะได้รับสินค้าอย่างแน่นอน หากแผนการสั่งซื้อได้ส่งมาล่วงหน้าตามที่ได้ตกลงกันไว้ในรอบระยะเวลาหนึ่งๆ โดยทางผู้ขาย จะทำการจองกำลังการผลิตที่มีอยู่ในแต่ละโรงงานผลิตไว้ให้ตามแผนการสั่งซื้อที่ได้รับมาล่วงหน้า

ในกรณีที่ผู้ซื้อส่งคำสั่งซื้อที่ไม่มีอยู่ในแผนการสั่งซื้อล่วงหน้า ทางผู้ขายจะไม่รับรองว่าผู้ซื้อจะได้รับสินค้านั้นอย่างแน่นอน แต่ก็จะไม่ปฏิเสธเสียทีเดียว ในกรณีนี้จะผลิตให้ก็ต่อเมื่อมีกำลังการผลิตเหลือและมีวัตถุดิบพอเพียง และที่สำคัญต้องไม่ส่งผลกระทบต่อคำสั่งซื้อตามแผนการผลิตล่วงหน้าของลูกค้ารายอื่นๆ ในการจับคู่อุปสงค์และอุปทานสิ่งที่ต้องคำนึงถึงจะประกอบไปด้วยลำดับความเร่งด่วนของงาน ระยะเวลาในการผลิต ระยะเวลาในการจัดหาวัตถุดิบ ระยะเวลาในการจัดจ้างแรงงาน ตลอดไปถึงจัดซื้อจัดหาเครื่องจักร

<b>Title</b>	Demand – Supply Matching in Electronic Manufacturing
<b>Student</b>	Miss Jinthana Insongkram
<b>Advisor</b>	Assoc.Prof.Dr.Wichian Premchaiswadi
<b>Level of Study</b>	Master of Science in Information Technology
<b>Major</b>	Information Technology Management
<b>Academic Year</b>	2000

## **ABSTRACT**

Currently short term plans (STP) Capacity registration is stored in the same table for demand and capacity side. Only 2 months of STP can be registered. For improved support over the exchange of capacity between business lines, Demand from business lines will be stored separately and used for the purpose of determination of orders Priority. In addition, Supply of Capacity from manufacturers will also be stored and used separately to determine the manufacturing center for the purpose of processing manufacturing orders.

To improve short term plan (STP) capacity utilization at each Manufacturing Centers, it has been agreed that STP Capacity will be registered as total capacity for each business line (BL)/communication category (CC)/communication group (CG)/month. Both demand and supply registration will later be used to compare when real orders are placed within a month. The demand supply matching gives situation fairness to both manufacturing part and business line. Business lines get the goods as demanded from each STP month as priority. Those not included in the STP month will get to the factories when supply capacity is available.

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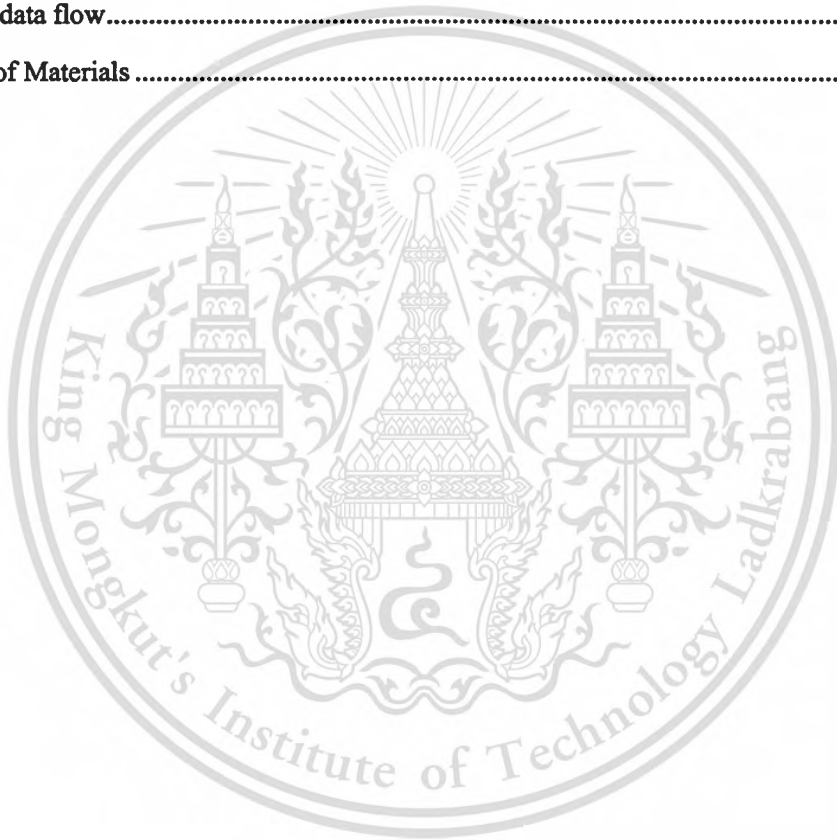
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# **Chapter 1**

## **Prefaces**

Currently short term plans (STP) Capacity registration is stored in the same table for demand and capacity side. Only 2 months of STP can be registered. For improved support over the exchange of capacity between business lines, Demand from business lines will be stored separately and used for the purpose of determination of orders Priority. In addition, Supply of Capacity from manufacturers will also be stored and used separately to determine the manufacturing center for the purpose of processing manufacturing orders.

To improve short term plan (STP) capacity utilization at each Manufacturing Centers, it has been agreed that STP Capacity will be registered as total capacity for each business line (BL)/communication category (CC)/communication group (CG)/month. Both demand and supply registration will later be used to compare when real orders are placed within a month. The demand and supply matching give situation fairness to both manufacturing part and business line. Business lines get the goods as demanded from each STP month as priority. Those not included in the STP month will get to the factories when supply capacity is available.

Both demand and supply registration will later be used to compare when real orders within a month are placed. This comparison process is described in detail in chapter 8 (Order Evaluated against Plan). To support order evaluation process, route of product is considered and will be created for each particular order base on the relationship between Item Group of order item and Item Group of start component. Bill of materials will also be taken into account during the process. All mentioned above is the scope of this project development.

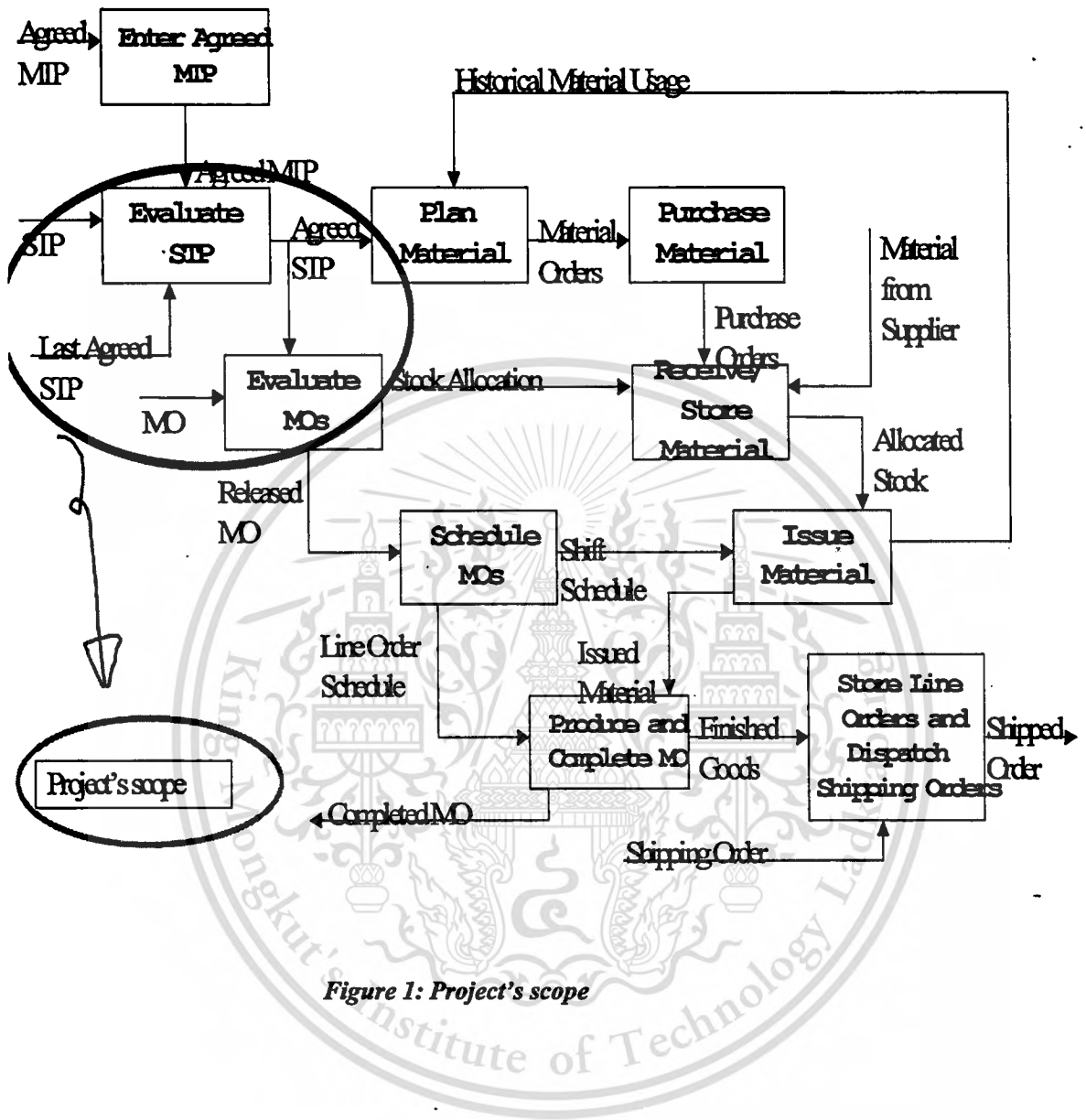


Figure 1: Project's scope

## Chapter 2

### STP Process Overview

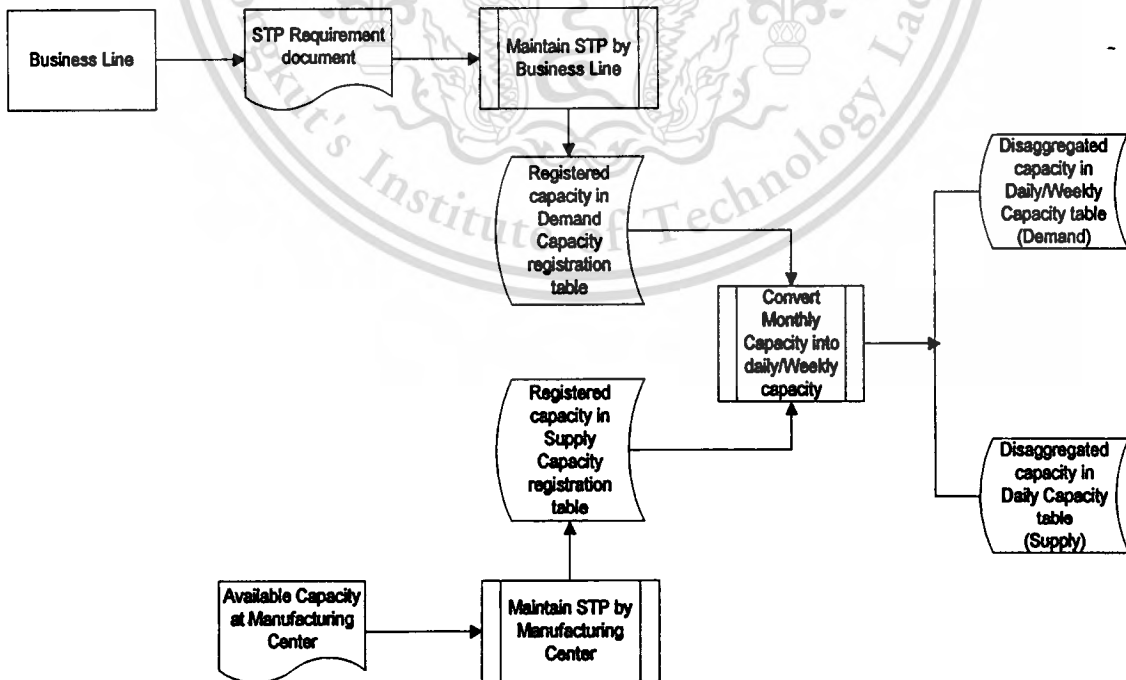
To understand the process, it is important to understand what each entity means in the process.

**Business Line:** Business Lines are entities that are both supplier as well as customer to the factory.

**Communication Group:** Communication group is an aggregation of resources capable of performing certain type of operation.

**Communication Category:** Communication category is aggregation of communication groups capable of performing a certain kind of operation. There are seven types of Communication Categories (Prober, Handler, Wafer Test, Backgrind, Sawing, Assembly, Testing and Packaging). Many communication groups can belong to one communication category.

**Effective Date:** Effective date is the first working day of the month based on the factory calendar.



**Figure2: STP data flow**

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Business Lines communicate to factory for the capacity they would like to reserve on a particular communication group in the subsequent logistic periods. This is based on their demand forecast with respect to their items/products. The capacity is reserved for only short period of time hence called “Short Term Plan”. The finalized STP for the subsequent months is registered during the penultimate / last week of the current month based on information received and interaction with the business lines.

The objectives of registering a monthly finalized STP for the subsequent months are:

- The registered STP for a Business Line is used during order evaluation process in which demands on capacity as raised by actual orders are compared to the forecast (in the form of capacity reservation), hence order priority decided.
- The registered STP can be used as a tool to compare forecast against actual orders received at a later date.
- The registered STP for a Manufacturing Center is consumed based on the demand side priority as decided during Order Evaluation stage.

Finally the STP so registered for concerned business lines is disaggregated into daily / weekly buckets over the ‘n’ month horizon so that forecast can be consumed by actual orders (when received) on the correct dates. This becomes necessary because of the fact that capacity reservation in the form of finalized STP is always entered on a monthly basis whereas the actual manufacturing orders always have delivery dates enclosed. Coupled with this is also the fact that some business lines send their orders on a weekly basis and others on a daily basis. The rationale used for disaggregation is described in one of the later sections of this document.

## Chapter 3

### Demand Registration

In order to provide the flexibility to register the STP by manufacturing center separately from STP registered by business line, two tables are created. STP or demand registration by business line will be stored in a table. To provide the flexibility to enter the STP requirement for “n” number of months, the table designed with total capacity registration must be provided. A field “month” also becomes a part of the primary key of the table. Each month is identified by a start date as defined in the Periods table for the Period type “Logistic”. With this concept, STP can be entered for ‘n’ months without any constraint on what ‘n’ can be.

**Session: Maintain Short Term Plan by Business Line.**

#### Description:

This session accepts short term plan of capacity registration for each Business Line (BL) against the difference communication groups.

#### Processing:

- When the record is saved, the unit shall be converted to base unit. Correspondingly the capacities registered in unit are converted into capacities in base unit, then the record is saved. The status of the record when inserted should be “registered”.
- The user should be able to insert, modify or delete the record.
- The user can modify or delete the record only if the record status is “registered”.
- The user can register the capacity for a month provided that:
  1. Disaggregation has not take place for an effective date/ Business Line/CC/mnth combination for the i/p month.
  2. The capacity is reserved for the effective date/BL combination for the previous month.
- Deletion of a record should not be permitted if a gap

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## Chapter 4

### Supply Registration

This process accepts short term plan of capacity registration for each Manufacturing Center (MC) against different communication groups.

#### Processing:

- When the record is saved, the unit is converted to base unit. Correspondingly the capacities registered in unit are converted into capacities in base unit, then the record is saved. The status of the record when inserted should be “registered”
- The user should be able to insert, modify or delete the record.
- The user can modify or delete the record only if the record status is “registered”.
- The user can register the capacity for a month provided that:
  1. Disaggregation has not take place for an effective date/ Manufacturing Center combination for the i/p month.
  2. The capacity is reserved for the effective date/MC/CC/mnth combination for the previous month.

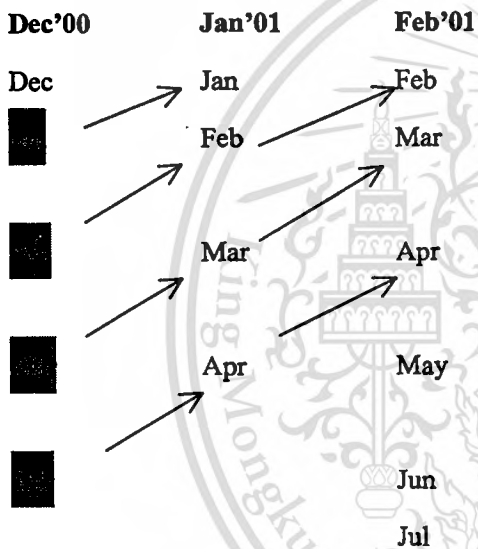
**Remark:** Unit will be the same for registered capacity and minimum allocation, hence care should be taken while converting unit to base unit.

## Chapter 5

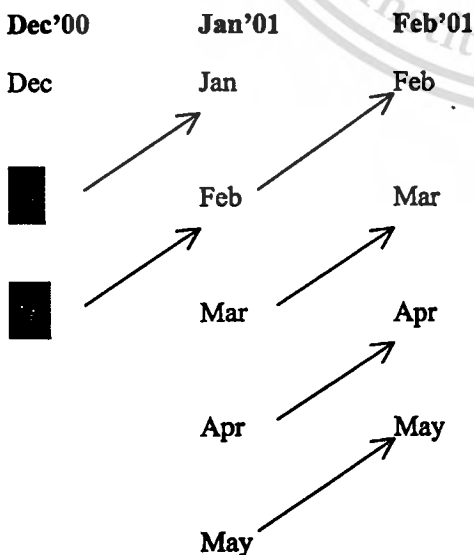
### Disaggregation of STP

The disaggregation logic and transfer of loads logic is applicable based on a BL/CG combination as the same BL may register STP on different CG's for a different number of months.

e.g. BL 116476-CC DIP22-01



BL116476 – CG 57-SENTRY-21



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The arrows indicate the transfer of consumption on disaggregation of STP for the next effective date. The highlighted parts indicate the “Valid = Yes” records after disaggregation. In above example, data for BL 116476 for effective date Jan '01 will include Apr '01 records copied from effective date Dec '00. After coping, the old set of April records with effective date Dec '00 are set to “Valid = No”.

- While registering STP with effective date of DEC '00, it is possible that BL 116476 registers a non zero STP for the months of Dec, Jan, Mar and April and zero STP for the month of Feb.
- Possible Combinations of registration of STP for the overlap (rolling) month(s) had been shown in above table 1
- After disaggregation of records for a certain effective date, if no records exist at all for a specific BL, it will still be allowed to enter STP for that BL with the same effective date and disaggregate, provided this is done before the start date of the month as per the company calendar. e.g. If STP was registered and disaggregated in the last week of Nov '00 28 Nov '00. For DEC '00 (effective date being 29 Nov) for BL's 130250 and 325092, it will still be allowed to enter and disaggregate STP for BL 116476 till 28 Nov'00.
- Disaggregation of STP for manufacturing center will also be done similarly as above explained for Business Line.

<u>First Effective Date</u>	<u>Next Effective Date</u>	<u>Action</u>
Home only	Home and Subcont	Old set of Home records made invalid and consumption transferred to Home records of new effective date.
Subcon only	Home and Subcon	Old set of records made invalid and consumption transferred to subcon records of new effective date.
Home and Subcont	Home only	Old set of Home records made invalid and consumption transferred to Home records of new effective date. Subcont records for next effective date should be entered with ZERO capacity reservation. Hence, Subcont records with old effective date will be made invalid, consumption will be transferred to subcont records with new effective date.
Home and Subcont	Subcont only	Old set of subcont records made invalid and consumption transferred to subcont records of new effective date. Home records for next effective date should be entered with ZERO capacity reservation. Hence, Home records with old effective date will be made invalid, consumption will be transferred to Home records with new effective date.
Home only	Subcont only	Home records with new effective date should be entered with ZERO capacity reservation. Old Home records will be made invalid.
Subcont only	Home only	Subcont records with new effective date should be entered with ZERO capacity reservation. Old subcont records will be made invalid.

**Table5.1: combinations of registration STP**

## Chapter 6

### Defining Bill of Materials

The orders from business lines do not only specify the product to be delivered but also which part of the manufacturing process to perform. Aside from details, the different is in assembly only, test only or assembly plus test category.

Explained in more detail, the options are:

- finished product (e.g. tube 12NC) is to be produced from its material components with assembly and testing operations.
- assembled product (untested IC) is produced from its material components with an assembly operation only a finished product (e.g. reel 12NCs) from the assembled product with a testing operation only

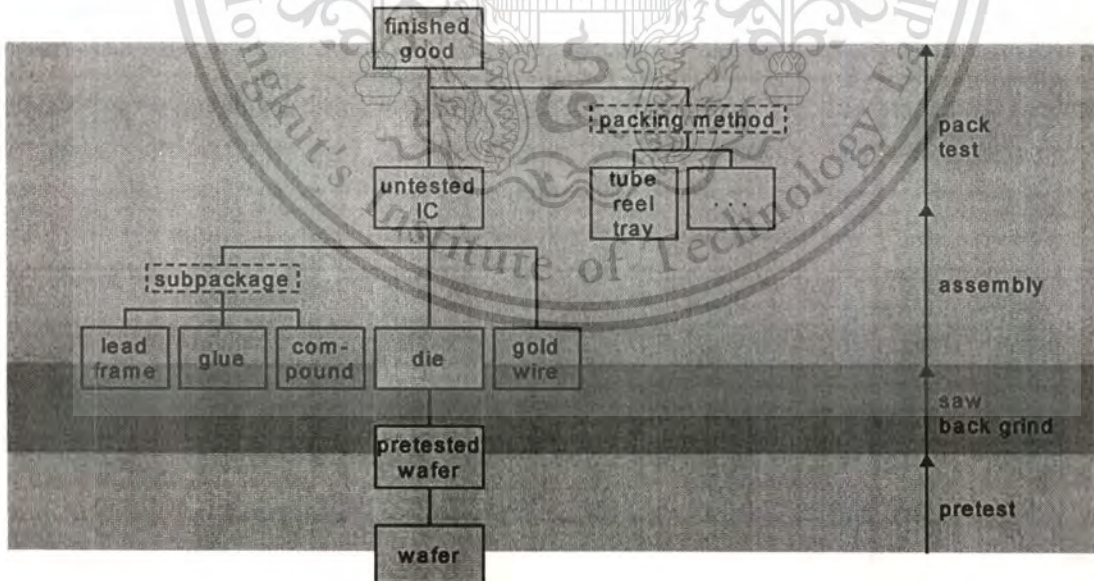


Figure 3: Bill of Materials

The ways orders come in from the business lines are process oriented: they tell us what to do. This is not supported by the system, which is output oriented: you tell it what you want from the process. System will then decide if a process is needed and if so which one(s). We use the bill of material (BOM) to define the “routing” of the target item.

In the system, an item can only have one BOM; no alternatives for different materials are possible. Therefore, if customer insists on specifying different routings (test only or assembly/test), two items are then needed. So the proposed structure is that when for products a second routing is needed, an additional variant (called 13NC) of the product will be created. This is normal procedure in the business.

In order to identify the 2 12NCs similar end product, the following coding structure will be applied.

- The end product produced for an assembly/test order gets the original 12NC for its item code.
- The item code of the end product produced by a test only order, will be that it's 12NC extended with an \*. In the latter case as well as the untested (assembled) IC will need a 12NC number.

It should be noted that for most products, no variants would be needed, because they are always produced in the same way. Only the structures used will be registered. In reality more product variants exist during the life cycle of a product. For example, a product initially could only be assembled in house and tested elsewhere. Later it will be tested in house. At that time a variant will be added, connecting it not to the assembled product, but straight to the die.

## Chapter 7

### Defining Routing

Semiconductors have manufacturing centers of type home and subcontractor. Subcontractor is further categorized into “local” and “remote”. The routing will be different for the same item when it is manufactured at home manufacturing center and at subcontractor manufacturing center. The routing information will be required by shop floor control (SFC) orders.

The routing of an order will depend not only on the order item but also the manufacturing centers and the start item. The way to change routing depends on the Manufacturing center, as well as the start item done as follow:

- Generate Routing details is made to fill the routing data for an order. This should be after order has been generated and before production orders pertaining to that order are made.
- Routing by order table contains fields for Order number, Sequence number, Production order number, Item group, Item, Start component and Manufacturing center.
- A field called start component is used to store the start item for the order. The item group of this start item along with the order item will help in deciding the type of order. For e.g. If the order item belongs to item group ICFP and if the start item is of item group CESF, then it is an Assembly and test order. Whereas if the start item group is ICAM then it is a test only order. Routing data for home assembly center will be maintained for each item. Final routing for order item can be obtained by exploding the BOM of this order item and in consolidating routing for each of the BOM items (item group for these items pertaining to item group set “BO”) until the item group corresponding to the start item is reached. This consolidated routing will be stored in a separate table.
- If start component is not specified then explode till the first level of BOM, barring phantom item.

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- Since at this point, the manufacturing center sequence are not filled hence the routing data will be filled assuming all the operations are performed at home.



## Chapter 8

### Orders Evaluated against Plan

After orders are created with a status “Proposed” then an evaluation process need to be done later to consume (match) capacity at the relevant communication groups and manufacturing centers depending on order accept date and/or revised delivery date. At the end of this stage the demand supply matching is complete.

Business Lines provide their requirement in terms of “Short term Plan” to ATO on the communication group. This demand has to be fulfilled by ATO through various manufacturing centers. The supply capacity available at various manufacturing centers for the communication group is known to ATO and is being entered into the system. Both demand and supply are registered in the system at the logistics month level. The demand is converted into daily/weekly basis for a particular BL/CG combination depending on the business line type. The supply is converted into daily basis for a particular MC/CG combination irrespective of the business line type. Thus the demand-supply matrix looks the following:

#### Communication group – CG01

	MC 1	MC 2	MC 3	Demand - Total
BL 1				D1
BL 2				D2
BL 3				D3
Supply –Total	MC1	MC2	MC3	

*Table 8.1: Demand & Supply matrix*

As it is evident, the demand on a communication group by a business line is not booked based on manufacturing center. Instead it is booked as a consolidated figure. Similarly, the capacity

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available for a communication group at a manufacturing center is not divided on the business line basis. This gives the flexibility to consume supply from any of the manufacturing center that has the required balance.

To manufacture the order item, various operations have to be performed. These operations are carried out in communication groups. Each order would place a load on each communication groups. Order should be evaluated and priority set as per the demand available for the business line at various CGs. If the order creates a load on communication groups which is less than or equal to the demand available then the order should be evaluated with a priority "High".

It is possible that an order is evaluated with a priority "Low" if demand available is insufficient to satisfy order quantity.

The fulfillment of the order is carried out at various manufacturing centers. While evaluating the orders, capacity is consumed at the manufacturing centers (CG/MC combination).

The following criteria's are taken into consideration during evaluation process.

1. Evaluation process should consume the demand registered by Business Line on communication group and the supply available for communication group at various manufacturing centers.
2. The status of the order should be changed from "Proposed" to "Evaluated" if the order is processed without any problem.
3. The order Evaluation should decide manufacturing center sequence for the production of the order item. This sequence should be updated in the order Table.
4. Order Evaluation should consider complete fulfillment of the order. Partial fulfillment should not be considered.
5. Manufacturing center for order with a priority "low" will always be "Home". If 12NC can not be manufactured at "Home", order should be on "Hold" and an error should be reported.

6. If evaluation process is unable to decide the manufacturing sequence/ center for an operation, the order revised quantity should be changed to zero. Status is also changed to "HOLD" and an error is reported.

The following example would help understand the evaluation process better. Consider an order "786" with order quantity of 110K for an item "testicfpitem" belonging to the item group "ICFP" given by Business Line "111111". Let the start component be "testceptitem" belonging to item group "CEPT".

The following summarizes the above:

Order item : testicfpitem

Start component: testceptitem

#### DEMAND CAPACITY CONSUMPTION:

The order evaluation process would read the order with a status "Proposed". The "Routing Data by order" table will be populated as follows:

Order	12NC	Seqno	Quantity	Item group
786	Testcesfitem	1	2040	CESF
786	Testcesfitem	2	2000	CESF
786	Testicamitem	3	3040	ICAM
786	Testicamitem	4	3000	ICAM
786	Testicfpitem	5	4110	ICFP
786	Testicfpitem	6	4210	ICFP
786	Testicfpitem	7	4000	ICFP

Table 8.2: Routing Data by order

Since start component "testceptitem" belongs to item group "CEPT" and the final product "testicfpitem" belongs to "ICFP", the following operations would be performed.

#### ➤ Pre-assembly (Backgrind and Saw)

- Assembly
- Test

This is reflected in the task codes.

- Assume that Test operation is performed at two lines (Test 1 and Test 2). The above table is read for the order with operation number in **ascending order**. The task codes correspond to each operation have to be performed on “testceptitem” to get “testcesfitem”.
- Assume that the operation is called “Pre-assembly” comprising of Backgrind and Saw.
- Assume that same task code is attached to both the communication categories.

Task code	Communication category
2040	Backgrind
2040	Saw

Table 8.3: Task code by Communication Category

From the task code, the communication category can be identified from “Communication Categories by Task code” table. The sequence number is identified from the task code. (2<sup>nd</sup> digit of the task code). Using communication category and sequence Id, the corresponding communication group name and conversion factor name are identified. Using the 12NC(testcesfitem) and the communication group name, the communication group is identified.

Similarly, the conversion factor is identified using the 12NC (testcesfitem) and the conversion factor name.

CC	Seq. Id	CG name	Conversion factor name	Method
Back-grind	0	Backgrind CG	Die per wafer	Divide
Saw	0	Saw CG	Die per wafer	Divide

Table 8.4: Conversion factor related

The complete link is summarized below.

Item	CC	Seq. Id	CG name	Conversion factor name	Method	CG
Testcesfitem	Backgrind	0	Backgrind CG	Die per wafer	Divide	Testbg01
	Saw	0	Saw CG	Die per wafer	Divide	Testsw01
Testicamitem	Assembly	0	Assembly CG	Assembly Speed		Testas01
Testicfpitem	Test	1	Test 1 CG	Test 1 Speed	Divide	Testts01
	Test	2	Test 2 CG	Test 2 Speed	Divide	Testts02

*Table 8.5: The complete link of STP*

Demand is calculated for the applicable CGs identified corresponding to home manufacturing centers. The load is compared with the balance demand available of the total registered for the BL/CG combination. If all applicable CGs have the requisite balance demand, then order priority is changed to "High". The demand is consumed by all applicable CGs. For Order: 786 Order quantity 110K

BL	CG	Conversion Factor	Load
111111	Testbg01	220	500
111111	Testsw01	220	500
111111	Testas01	1	110000
111111	Testts01	2200	50
111111	Testts02	2200	50

*Table 8.6: Demand Capacity Consumption*

#### **SUPPLY CAPACITY CONSUMPTION:**

Supply capacity check will be performed only if order priority is "High". For the 110K, the manufacturing centers at which the CGs has their capacities have to be identified. The relationship between item and the manufacturing center is established as follows.

Item	Item Group	Operation	Seq	MC
Testicfpitem	ICFP	Test	1	HABDEF
Testicfpitem	ICFP	Test	2	HBCFG
Testicamitem	ICAM	Assembly	0	HACD
Testceptitem	CEPT	Pre-assembly	0	ABCH

*Table 8.7: Item and Manufacturing Center relationship*

The above table explains the following.

The test operation line 1 can be performed at manufacturing centers H, A, B, D, E, F in the priority as it appears in the string. Similarly, for testicamitem of item group "ICAM", assembly operation can be performed at H, A, B, C, F, G in that order and so forth.

Supply Side consumption shall be done for the order quantity. Capacity shall be checked at various manufacturing centers to determine if order quantity can be manufactured there or not.

The routing table by order is read once more with operation number in the ascending order for the order. Communication group is identified for the particular task code.

So for communication group testbg01, balance supply is checked at manufacturing centers A, B, C and H in that order. Load is calculated for the order quantity (the load is calculated using the conversion factors corresponding to the Home manufacturing center type). The minimum allocation check is done for all the manufacturing centers. If the manufacturing center does not pass the minimum allocation check, then the next manufacturing center listed in the string is considered. However if the manufacturing center passes the minimum allocation check, then the other subsequent manufacturing centers are not considered. Capacity is consumed at the concerned manufacturing center. The next communication category is selected for processing.

If none of the manufacturing centers pass the minimum allocation check, then all the manufacturing centers are checked for the maximum allocation check. If any manufacturing center passes the maximum allocation check, then the subsequent manufacturing centers are not considered. Capacity is consumed at the selected manufacturing center. The next communication category is selected for processing.

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Also the type of manufacturing center is checked. If the center is "Remote" or "Local" then the subcon task code corresponding to the original task code is found. This subcon task code will overwrite the original task code.

*If the manufacturing centers fail both the minimum allocation check as well as maximum allocation check, then the supply is consumed at the home manufacturing center.*

If the home-manufacturing center is not a eligible manufacturing center for the operation, then order status is changed to "Hold" and the demand consumed is released.

The **minimum allocation check** is as follows

Load on the manufacturing center is calculated as explained above. The conversion factor in this case would correspond to the type of the manufacturing center.

If  $(\text{Load} + \text{consumed capacity}) \leq \text{minimum allocation capacity}$  then  
     manufacturing center is eligible

else

    manufacturing center does not pass the test.

Endif

The **maximum allocation check** is as follows

If  $(\text{load} + \text{consumed capacity}) \leq \text{total capacity}$  then

    Manufacturing center is valid

Else

    Manufacturing center does not pass the test.

Endif

The manufacturing center selected for the previous operation becomes the preferred manufacturing center for the next operation provided. It is one of the eligible manufacturing center for the operation. If it is not, then the processing is done as it is done for any operation. If the preferred manufacturing center does not pass the minimum allocation as well as the maximum

allocation test, the other manufacturing centers noted for the operation is considered excluding the preferred manufacturing center.

If during the supply side consumption demand is available at all the relevant CGs, it is identified that none of the manufacturing centers are able to satisfy the load and home manufacturing center is not one of the eligible center, then the order is evaluated with status "Hold" and the order quantity is changed to ZERO.

If demand is not available at a certain CG, then the order is evaluated with a priority "Low". If all the operations have home manufacturing center as eligible then home manufacturing center is assigned for each operation. If yes then the status is changed to "Evaluated". Otherwise, the status is changed to "HOLD".

The above processing illustrated how the processing would be done for a typical order. This processing shall be done for all the orders with a status "Proposed". The Processing output is summarized below.

Demand Available at CGs	Supply available at MCs	Home center eligible	Status	Priority	Action
Yes	Yes	N.A.	Evaluated	High	Demand consumed at BL/CG combn. Supply consumed at MC/CG combn.
Yes	No	Yes	Evaluated	High	Demand consumed at BL/CG combn. Supply consumed at Home MC/ CG combn
Yes	No	No	Hold	Low	Demand is not consumed. Supply is also not consumed; order qty is changed to Zero.
No	NA	No	Hold	Low	Demand is not consumed. Supply is also not consumed. Priority Low. Status Hold
No	NA	Yes	Evaluated	Low	Demand is not consumed. Supply is also not consumed. Priority Low. Status Evaluated. Home mfg center assigned to every operation.

*Table 8.8: STP Processing Output*

## Chapter 9

### System Development

According to the requirements mentioned earlier, the possible or suitable solutions are proposed in the development stage. This chapter describes the details of form or session, table and some report. For some major or important sessions, the logic behind each session will be presented in this document.

#### 9.1 Session development

The following table lists the core sessions:

SEQ. NO.	SESSION NO.	SESSION NAME
1.	tir002	Generate Routing Data
2.	tis007	Maintain Short Term Plan By Business Lines
3.	tis008	Maintain Short Term Plan by Manufacturing Center
4.	tis015	Maintain Short Term Plan Bucket By Business Lines
5.	tis006	Maintain Communication groups By Communication category
6.	tcc908	Maintain Manufacturing Centers
7.	tis014	Convert Monthly Capacity to Daily / Weekly Capacity
8.	tim003	Maintain Communication Category by Task
9.	(tim005	Maintain Manufacturing Centers by item

*Table 9.1: Core Sessions*

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**9.1.1 Session: Generate Routing Data**

**Description**

This session will fill the Customized routing table for the MO numbers specified on the form.

**Screen Layout: Generate Routing Data (tir002)**

Generate Routing Data	
MO Number	From : 1FFFFFFF
	To: 2FFFFFFF
	3FFFFFFFFFFFFFFFFFFFFFFFFF

*Table 9.2: Routing data Generation Screen layout*

**Screen Fields**

SEQ. NO.	SCREEN FIELD NAME	DESCRIPTION	FIELD TYPE	DEFAULT	DISPLAY FORMAT	ZOOM
1	mono.f	From	Input			MO table
2	mono.t	To	Input	ZZZZZZZZ		MO table
3	process.mesg		Display			

*Table 9.3: Routing data Generation Screen Fields*

**Process Logic:**

1. Lock the session so that it is a single user session.
2. Select the MOs in the given range which have the status (.most) as "Proposed".
3. Display the message "Processing" in process.mesg field on the form.
4. Explode BOM (Call tirou9001)
5. If no error then
  - Call tirou9002 – Fill routing table.
  - Endif
6. If no error then
  - Save the data in Routing by MO
  - Else
  - Store the errors in Error Messages table
  - Endif
7. Repeat from step 2 for the next MO.
8. After completion of the process give the message "Processing completed with/without errors" in the process.mesg field depending on errors encountered during the process.
9. Release the session lock.

***tirou9001 – Explode BOMs***

1. This will be called by the session Routing Data Generation. The MO item and MO start item should be passed as inputs to this. The output variables shall include out start item, wafertest item, test item, assembly item and error. If start component is blank then MO table will be updated with the value of out start item.
2. If the start item is blank, the start item group = blank.
3. If the start item is non-blank then get the start item group for this start item.
4. If the start item group is non-blank then get the item group for main item. Check for the validity of main item group and start item group. They should belong to the item group set "BO" otherwise log an error and come out of tirou9001.
5. If the start item group is blank then check only for the validity of item group of main item.

6. Get the item group set for this start item group. The item group should be searched for, in item group sets (.cigs) “AM”, “SF” , “PT” and “DI”. If it is does not belong to either of this item group sets then log an error and come out of the tirou9001.
7. Explode the BOM to get the items whose item group belongs to item group set “BO”. Explode the BOM until the item belonging to start item set is obtained. The value of the item belonging to start item set is stored as out start item.
8. If start item group set is blank then explode the BOM upto the level at which first non-phantom item belonging to the item group set “BO” is obtained. Store the value of this item as out start item.
9. For each of the items encountered during BOM explosion determine the item group set as per the following logic.
  - If item group set = “FP” then
    - The item is a test.item
  - Endif
  - If item group set = “AM” then
    - The item is an assembly.item
  - Endif
  - If item group set = “SF” then
    - The item is a preassembly.item
  - Endif
  - If item group set = “PT” then
    - The item is a pretest.item
  - Endif

***tirou9002 – Fill routing table***

This will be used to fill the data in routing table.

Input variables will include – MO number, MO item, routing code, wafertest item, assembly item and test item.

Output (Reference) Variable – Error

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Get the manufacturing center code (.acde) corresponding to home assembly center

1. Initialize sequence number (.sqno) = 10
2. Current.item = wafertest.item
3. If Current.item is not blank then

Get item group(.citg) for current item from Item master

Initialize operation number (.opno) = 10

Read the routing details for this item from routing table.

If the task is Packing and packing has not been inserted earlier then

Copy the routing data to Routing by MO

If MO table(.mono) = "" then

MO.number = "DUMMYABC001"

Else

MO.number = MO number (.mono)

Endif

SFC number = ""

MO routing data (.bitm) = current.item

Else

Delete packing task codes pertaining to previous value of

current item.

Endif

Increment operation number by 10

4. Insert the record in Routing by MO
5. Repeat from step 3 for current item = assembly item and test item



**Screen Fields**

SEQ. NO.	SCREEN FIELD NAME	DESCRIPTION	FIELD TYPE	DEFAULT	DISPLAY FORMAT	ZOOM
1	tis007.efdt	Effective Date	Input	Next Eff. Date	-	Yes
2	tis007.prgr	Business Line	Input	0	ZZZZZ9	Yes
3	tcc901.nama	Business Line Description	Display	Blank	-	-
4	tis007.coca	Communication Category	Input	Assembly	-	-
5	tis007.mnth	Month	Input	Next month start date	mmmyyyy	Yes
6	tis007.cogr	Communication Group	Input	-	-	Yes
7	tis007.unit	Unit	Input	tis006.basu	-	Yes
8	tis007.car1	Registered Capacity	Input	-	-	-

*Table 9.5: Maintain Short Term Plan by Business Line Screen Fields*

SEQ. NO.	SCREEN FIELD NAME	FIELD VALIDATION
1	tis007.efdt	<ul style="list-style-type: none"> <li>• Default value should always be the effective date immediate w.r.t. the system date.</li> <li>• Date entered should greater then or equal to System date.</li> <li>• Input mandatory(cannot be blank)</li> <li>• Date entered should exist in table "Periods" (tfg005) for period type "Logistic" with correction period as "No".</li> </ul>
2	tis007.pgrg	<ul style="list-style-type: none"> <li>• Business Line should be of type "Order from" and must exist in the "Funlocs (tcc901)" table.</li> <li>• Zoom should show Funlocs of type "Order From"</li> <li>• Input mandatory(cannot be blank)</li> </ul>
3	tcc901.nama	<ul style="list-style-type: none"> <li>• No validations</li> </ul>
4	tis007.coca	<ul style="list-style-type: none"> <li>• Input Mandatory(cannot be empty)</li> <li>• Communication Category entered should exist in table Communication Group by Communication Category (tis006).</li> </ul>
5	tis007.mnth	<ul style="list-style-type: none"> <li>• Date entered should exist in table "Periods" (tfg005).</li> <li>• Date entered cannot be less than effective date (tis007.efdt)</li> <li>• Zoom to Periods should display logistic periods with correction period as "No"</li> <li>• Date cannot be the start date of month for which BL has already registered capacity with the same communication category for the input effective date and disaggregation has taken place for the corresponding effective date.</li> <li>• STP has to be registered in the consecutive fashion for a particular month without any break for a effective date/BL combination. (See Processing)</li> </ul>

SEQ NO.	SCREEN FIELD NAME	FIELD VALIDATION
6	tis007.cogr	<ul style="list-style-type: none"> <li>● Communication Group should exist in table Communication Group by Communication Category (tis006).</li> <li>● Zoom to communication groups which belong to communication category as entered in input field Communication Category.</li> </ul>
7	tis007.unit	<ul style="list-style-type: none"> <li>● Default value should always be as that entered for Communication group in table Communication Group by Communication Category (tis006).</li> <li>● Unit entered should exist as base unit in table "Communication Group by Communication Category" (tis006) for Communication Group.</li> </ul>
8	tis007.carl	<ul style="list-style-type: none"> <li>● Negative values are not allowed</li> </ul>

*Table 9.6: Maintain Short Term Plan by Business Line Screen Fields detail*

#### **Processing:**

- When the record is saved, the unit should be converted to Base unit. Correspondingly the capacities registered in unit should be converted into capacities in base unit and then the record should be saved. The status of the record when inserted should be "registered"
- The user should be able to insert, modify or delete the record.
- The user can modify or delete the record only if the record status is "registered".
- The user can register the capacity for a month provided
  - Disaggregation has not taken place for a effective date/ Business Line/CC/mnth combination for the i/p month.
  - The capacity is reserved for the effective date/BL combination for the previous month.
- Deletion of a record should not be permitted if there is a gap allowed for commercial use.

**9.1.3 Session: Maintain Short Term Plan By Manufacturing Center (tis008)**

**Description**

This session will accept short-term plan of capacity registration for each Manufacturing Center (MC) against different communication groups as per the screen layout defined below.

**Screen Layout**

Maintain Short Term Plan By Manufacturing Center			
<u>Effective Date</u>	:	1) FFFFFFFF	
<u>Manufacturing Center</u>	:	2) 3) FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	
<u>Communication Category</u>	:	4) FFFFFFFF	
<u>Month</u>	:	5) FFFF	
<u>Comm Group</u>	<u>Unit</u>	<u>Reg. Capacity</u>	<u>Min Allocn</u>
6) FFFFF	7)	8) FFFFFFFF.FF	9) FFFFFFFF.FF
6) FFFFF	7)	8) FFFFFFFF.FF	9) FFFFFFFF.FF
6) FFFFF	7)	8) FFFFFFFF.FF	9) FFFFFFFF.FF

*Table 9.7: Maintain Short Term Plan by Manufacturing Center Screen Layout*

**Screen Fields**

SEQ. NO.	SCREEN FIELD NAME	DESCRIPTION	FIELD TYPE	DEFAULT	DISPLAY FORMAT	ZOOM
1	tis008.efdt	Effective Date	Input		-	Yes
2	tis008.acde	Manufacturing Center	Input		-	Yes
3	tcc908.dsca	Mfg. Center description	Display		-	-
4	tis008.coca	Communication Category	Input	Assembly	-	-
5	tis008.mnth	Months	Input	-	mmmmyyyy	Yes
6	tis008.cogr	Communication Group	Input		-	Yes
7	tis008.unit	Unit	Input	tis006.basu	-	Yes
8	tis008.car1	Registered Capacity	Input	-	-	-
9	tis008.minl	Minimum Allocation	Input	-	-	-

*Table 9.8: Maintain Short Term Plan by Manufacturing Center Screen Fields*

SEQ. NO.	SCREEN FIELD NAME	FIELD VALIDATION
1	tis008.efdt	<ul style="list-style-type: none"> <li>● Default value should always be the effective date immediate w.r.t. the system date.</li> <li>● Date entered should greater then or equal to System date.</li> <li>● Input mandatory(cannot be blank)</li> <li>● Date entered should exist in table "Periods" (tfg005) for period type "Logistic".</li> </ul>
2	tis008.acde	<ul style="list-style-type: none"> <li>● Manufacturing Center should exist in table tcc908.</li> <li>● Zoom should show all manufacturing centers.</li> <li>● Input mandatory(cannot be blank)</li> </ul>
3	tcc908.dsca	<ul style="list-style-type: none"> <li>● No validations</li> </ul>
4	tis008.coca	<ul style="list-style-type: none"> <li>● Input Mandatory(cannot be empty)</li> <li>● Communication Category entered should exist in table Communication Group by Communication Category (tis006).</li> </ul>
5	tis008.mnth	<ul style="list-style-type: none"> <li>● Date entered should exist in table "Periods" (tfg005).</li> <li>● Date entered cannot be less than effective date (tis007.efdt)</li> <li>● Zoom to Periods, should display logistic periods with correction period as "No"</li> <li>● Date cannot be the start date of month for which MC has already registered capacity with the same communication category for the input effective date and disaggregation has taken place for the corresponding effective date.</li> <li>● STP has to be registered in the consecutive fashion for a particular month without any break for a effective date/MC combination. (See Processing)</li> </ul>

SEQ. NO.	SCREEN FIELD NAME	FIELD VALIDATION
6	tis008.cogr	<ul style="list-style-type: none"> <li>• Communication Group should exist in table Communication Group by Communication Category (tis006)</li> <li>• Zoom should only show communication groups which belong to communication category as entered in input field Communication Category.</li> </ul>
7	tis008.unit	<ul style="list-style-type: none"> <li>• Default value should always be as that entered for Communication group in table Communication Group by Communication Category (tis006).</li> <li>• Unit entered should exist as base unit in table "Communication Group by Communication Category" for Communication Group</li> </ul>
8	tis008.car1	<ul style="list-style-type: none"> <li>• Negative values are not allowed</li> </ul>
9	tis008.min1	<ul style="list-style-type: none"> <li>• Negative values not allowed</li> <li>• Should not be greater than Reg. Capacity (tis008.car1)</li> </ul>

Table 9.9: Maintain Short Term Plan by Manufacturing Center Screen Fields detail

#### Processing:

- When the record is saved, the unit should be converted to Base unit. Correspondingly the capacities registered in unit should be converted into capacities in base unit and the record should be saved. The status of the record when inserted should be "registered"
- The user should be able to insert, modify or delete the record.
- The user can modify or delete the record only if the record status is "registered".
- The user can register the capacity for a month provided that

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- Disaggregation has not taken place for a effective date/ Manufacturing Center combination for the i/p month.

- The capacity is reserved for the effective date/MC/CC/mnth combination for the previous month.

**9.1.4 Session: Maintain Short Term Plan Bucket By Business Lines (tis015)**

**Description**

This session will maintain STP Bucket by Business Line (BL) either daily or weekly as per the screen layout defined below.

**Screen Layout**

Maintain Short Term Plan Bucket By Business line		
Business Line	Description	STP Bucket
1) FFFF	2) FFFFFFFFFFFFFFFFFFFFFFFFFF	3) FFFF
1) FFFF	2) FFFFFFFFFFFFFFFFFFFFFFFFFF	3) FFFF
1) FFFF	2) FFFFFFFFFFFFFFFFFFFFFFFFFF	3) FFFF

**Table 9.10: Maintain Short Term Plan Bucket by Business Line Layout**

**Screen Fields**

SEQ NO.	SCREEN FIELD NAME	DESCRIPTION	FIELD TYPE	DEFAULT	DISPLAY FORMAT	ZOOM
1	tis015.prgr	Business Lines	Input	-	-	Yes
2	tcc901.nama	Description	Display	-	-	-
3	tis015.type	STP Bucket	Input	-	-	-

*Table 9.11: Maintain Short Term Plan Bucket by Business Line screen fields*

### 9.1.5 Session: Maintain Communication Groups By Communication Category (tis006)

**Description**

This session will maintain Communication Group (CG) by Communication Category as per the screen layout defined below.

**Screen Layout**

Maintain Communication Groups by Communication Category		
Communication Category	Communication Group	Base Unit
1) FFFFFFFF	2) FFFFFFFF	3) F
1) FFFFFFFF	2) FFFFFFFF	3) F
1) FFFFFFFF	2) FFFFFFFF	3) F

*Table 9.12: Maintain Communication Group by CC Screen Layout*

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### Screen Fields

SEQ. NO.	SCREEN FIELD NAME	DESCRIPTION	FIELD TYPE	DE FAULT	DISPLAY FORMAT	ZOOM
1	tis006.coca	Communication Category	Input	-	-	-
2	tis006.cogr	Communication Group	Input	-	-	-
3	tis006.basu	Base Unit	Input	-	-	Yes

Table 9.13: Maintain Communication Group by CC Screen Fields

#### 9.1.6 Session: Maintain Manufacturing Centre (tcc908)

##### Description

This session will maintain Manufacturing Centres along with priorities, type and Country of Origin as per the screen layout defined below.

##### Screen Layout

Maintain Manufacturing Centers				
<u>Manufacturing Center Code</u>	Description	Type	Country of Origin	
1)	2) FFFFFFFFFFFFFFFFFF	3) FFFF	4) 5) FFFFFFFFFFFFFF	
1)	2) FFFFFFFFFFFFFFFFFF	3) FFFF	4) 5) FFFFFFFFFFFFFF	
1)	2) FFFFFFFFFFFFFFFFFF	3) FFFF	4) 5) FFFFFFFFFFFFFF	
1)	2) FFFFFFFFFFFFFFFFFF	3) FFFF	4) 5) FFFFFFFFFFFFFF	

Table 9.14: Maintain Manufacturing Centers Screen Layout

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## Screen Fields

SEQ. NO.	SCREEN FIELD NAME	DESCRIPTION	FIELD TYPE	DEFAULT	DISPLAY FORMAT	ZOOM
1	tcc908.acde	Manufacturing Center Code	Input		-	
2	tcc908.dsca	Description	Input		-	
3	tcc908.type	Type	Input	.type.local	-	-
4	tcc908.ccty	Country of Origin	Input	-	-	Yes
5	tcc010.dsca	Description	Display		-	

Table 9.15: Maintain Manufacturing Centers Screen Fields

### 9.1.7 Session: Convert Monthly Capacity into Daily/Weekly Capacity (tis014)

#### Description

Depending on entered criteria by user, this session will process Business Line Monthly capacity into Daily / Weekly capacity OR Monthly capacity of Manufacturing center into Daily capacity.

This session is a Process session which reads total Demand Capacity Registration table (tis007) or total Supply Capacity Registration table (tis008) depending on user selected criteria of disaggregation for BL or MC respectively.

Demand Capacity Registration table (tis007) stores monthly capacity registered by a business line for a particular month for a given effective date.

Supply Capacity Registration table (tis008) stores monthly capacity registered by a manufacturing center for a particular month for a given effective date.

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All the registered monthly capacities with effective date matches the i/p date, this would be read. The session would disaggregate the monthly capacity into daily/weekly capacity based on certain criteria as explained in the processing logic of the session. The disaggregated records would be stored in Daily/Weekly Capacity table with valid flag as Yes.

The Status of the monthly capacity records that are successfully disaggregated shall be changed from “Registered” to “Disaggregated”.

### Screen Layout

Convert Monthly Capacity into Daily/weekly Capacity	
Effective Date	: 1) FFFFFFFF
BL / MC	: 2) FFFFFFFFFFFFFFFFFF
Business Lines From	: 3) FFFFF
To	: 4) FFFFF
Manufacturing From	: 5) ? ? ? ? ?
Center To	: 6) ? ? ? ? ?
Processing	

*Table 9.16: Convert monthly Capacity into Daily/Weekly Screen Layout*

**Screen Fields**

SEQ. NO.	SCREEN FIELD NAME	DESCRIPTION	FIELD TYPE	DEFAULT	DISPLAY FORMAT	Zoom
1	effective.date	Input Effective Date	Input	N e x t L o g i s t i c P e r i o d E f f e c t i v e D a t e	-	Yes
2	bl.mc	BL/MC	Input	Business Line		
3	prgr.f	Business Lines.	Input		-	Yes
4	prgr.t	Business Lines	Input	999999	-	Yes
5	acde.f	Manufacturing Center From.	Input	Blank		Yes
6	acde.t	Manufacturing Center To.	Input	Max (domain)		Yes

*Table 9.17: Convert monthly Capacity into Daily/Weekly Screen Fields*

SEQ. NO.	SCREEN FIELD NAME	FIELD VALIDATION
1	effective.date	<ul style="list-style-type: none"> <li>● Input Date should be the start date of valid Logistic period (Non-correction period) as maintained in the periods table (tfg005).</li> <li>● Input Date should be later than the system date .</li> <li>● Input Date should be the earliest effective date for which monthly capacity records with status "Registered" exist in the total capacity registration tables (tis007)/(tis008).</li> </ul>
2	prgr.f	<ul style="list-style-type: none"> <li>● Allow zoom into Funlocs list</li> <li>● Entered BL must exist in Funlocs table (tcc901).</li> </ul>
3	prgr.t	<ul style="list-style-type: none"> <li>● Allow zoom into</li> <li>● Entered BL must exist in Funlocs table (tcc901).</li> <li>● prgr.t should be greater than prgr.f</li> </ul>
4	acde.f	<ul style="list-style-type: none"> <li>● Allow Zoom into "Manufacturing Centers"</li> <li>● Manufacturing Center entered should exist in table "Manufacturing Center" table. (tcc908).</li> </ul>
5	acde.t	<ul style="list-style-type: none"> <li>● Allow Zoom into "Manufacturing Centers"</li> <li>● Manufacturing Center entered should exist in table "Manufacturing Center" table. (tcc908).</li> <li>● acde.t should be greater than acde.f.</li> </ul>

*Table 9.18: Convert monthly Capacity into Daily/Weekly Screen Fields detail*

## Processing

1. Read the input date for which disaggregation has to be done.
2. If the date is valid, Perform checks as elaborated in Routine **“Validate I/P”** when user presses **“Continue Process [Y]”** choice. The output of the routine is a flag that would indicate if processing can be done or not. If flag is false, stop the processing, else continue to next step.

Set the variable **“current.month.date”** as 0.

If disaggregation is for Business Line then

Select the records with status **“Registered”** and effective date as the input effective date and for the range of Business Line and Month sorted on index 3 (**tis007.efdt, tis007.mnth, tis007.prgr, tis007.coca, tis007.cogr**) and primary key **efdt/BL/CC/month/CG (tis007.efdt, tis007.prgr, tis007.coca, tis007.mnth, tis007.cogr)** respectively. If no records are selected, give the appropriate message and stop processing.

else if disaggregation is for Manufacturing Center then

Select the records with status **“Registered”** and effective date as the input effective date and for the range of Manufacturing Centers and Month sorted (**tis008.efdt, tis008.mnth, tis008.acde, tis008.coca, tis008.cogr**) and primary key **efdt/MC/CC/month/CG (tis008.efdt, tis008.acde, tis008.coca, tis008.mnth, tis008.cogr)** respectively. If no records are selected, give the appropriate message and stop processing.

endif

3. For each selected record,
  - a. Perform Routine **“Convert Monthly Capacity into Daily/Weekly Capacity”**.
    - a. Set the variable **“current.month.date”** equal to field **tis007.mnth/tcc901.mnth** (start date of logistic month for which capacity is registered).

**4. If disaggregation is by Business Line then**

Get maximum month for each Business Line from Daily/Weekly Registration table for user specified effective date and range of Business Lines.

For each record corresponding to each Business Line search all records from Daily/Weekly Registration table(tis004) with effective date less than input effective date and for all months greater than maximum month of Business Line and Valid flag = "Yes".

Insert the records found into Daily/Weekly Registration table for input effective date with Valid flag = "Yes".

Set the value of "Valid flag" for old records (for effective date less than input effective date) in Daily/Weekly registration table to "No".

else if disaggregation is by Manufacturing Center

Get maximum month for each Manufacturing Center from Daily/Weekly Registration table for user specified effective date and range of Manufacturing Centers.

For each record corresponding to each Manufacturing Center search all records from Daily/Weekly Registration table(tcc901) with effective date less than input effective date and for all months greater than maximum month of Manufacturing Center and Valid flag = "Yes".

Insert the records found into Daily/Weekly Registration table for input effective date with Valid flag = "Yes".

Set the value of "Valid flag" for old records (for effective date less than input effective date) in Daily/Weekly registration table to "No"

endif

5. Update all the changes made to the database.
6. Give the appropriate message indicating the Process results.

#### **Routine Validate I/P:**

##### **a) Check Logistic Periods**

- Determine all the months in the entered month range for which capacity has been registered for an input effective date.
- Ascertain if logistic period is defined in Periods table (tfg005) for each of the above month.
- If logistic period is not defined in the Periods table (tfg005) for any month, then give error message on screen and set the flag to false.

##### **b) Check Company Calendar**

- Determine the end date for the latest month of entered month range for which monthly capacity has been registered with effective date as the input date.
- Check if the record is present in the Company calendar table with primary key(Work center/ Date) as ("ZZZ", input date). Check the same for the end date as calculated above.
- If both the records exist, Company calendar is properly defined for processing to take place.
- If either of the two records do not exist, Company Calendar is incorrectly defined for processing. In such case, give error message and set the flag as false.

#### **Routine Convert Monthly Capacity into Daily/Weekly Capacity:**

1. Check if current.month.date is equal to the tis007.mnth/tis008.mnth (start date of the logistic month for which capacity is registered) of the selected record.
2. If no, Perform the routine " **Determine work days of month**". Output of the routine is one or two lists depending on i/p criteria, one list containing the working days of

the month and the corresponding working time per day (Daily List) and the other list containing the dates of last day of the weeks in the month and the cumulative working time per week (Weekly List).

If disaggregation is for business line then

Perform the routine “ **Determine the type of Disaggregation**”. The routine would set the value of disaggregation type to either “Daily” or “Weekly”

else if disaggregation is for manufacturing center then

set the value of disaggregation type to “Daily”.

endif

3. Update the booking days list [days on which capacity is to be booked for BL/CG OR MC/CG combination] with Daily List if disaggregation type is daily or with Weekly List if disaggregation type is weekly.
4. For each date in the booking List, Perform the routine “**Calculate and Book Capacity**”.
5. Change the status of the selected total registration table record to “Disaggregated”.

**Routine Determine work days of month:**

1. For the logistic month with the start date equal to tis007.mnth/tis008.mnth, determine the end date of the same.
2. Set the total percentage working time equal to zero (0). Set the number of working days equal to zero (0).
3. Read all the dates between start date of the logistic month (tis007.mnth/tis008.mnth) and its corresponding end date from the Company calendar table.
4. For each date selected, perform the following
  - a. Determine if the percentage working time (.pcwt ) is greater than zero. If no; then skip to point 4d. If yes then increment the no of working days by the factor  $[(\text{percentage working time}(\text{company clendar.pcwt}) / 100)]$ .

- b. Add the percentage working time to the total percentage working time.
- c. Store the date and the corresponding percentage working time in the Daily List.
- d. if disaggregation is for Business Line then

Determine if the date is the last date of the week. If yes, then store the date and the total percentage working time to the weekly list. Also reset the total percentage working time to zero. If no, then skip to the next date selected.

endif

#### **Routine “Determine type of Disaggregation”**

1. Check the business line STP Bucket. If the STP Bucket is daily, then disaggregation type is daily else disaggregation type is weekly.

#### **Routine “Calculate and Book Capacity”**

Calculate the disaggregated capacity for the given date in the booking list as follows

$$\text{Disaggregated capacity} = (\text{total monthly capacity} * \text{percentage working time stored corr. to the date}) / (\text{no. of working days} * 100)$$

*If disaggregation is for Manufacturing Center then*

$$\text{Disaggregated minimum allocation capacity} = (\text{Minimum Allocation capacity}(\text{tis008.minl}) * \text{percentage working time stored corr. to date}) / (\text{no. of working days} * 100)$$

endif

1. if disaggregation is by Business Line then

Search for a record in Daily/Weekly Registration table with effective date less than input date but mnth/BL/CC/CG same as the selected record of Total registration table(tis008)and daily weekly date(tis004.dawe) equal to given date in the booking list and valid flag equal to Yes.

else if disaggregation is by Manufacturing Center then

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Search for a record in Daily Registration table with effective date less than input date but mnth/MC/CC/CG same as the selected record of Total registration table (tis008) and daily date(tcc901.dawe) equal to given date in the booking list and valid flag equal to Yes.

endif

2. If record is not found then consumed capacity = 0 else consumed capacity = consumed capacity of the found record. If the record is not found, then skip to step 4 else step 3.
3. Set the valid flag of the found record to No and update the found record.
4. If disaggregation is by Business Line then

Insert the new disaggregated record in Daily/Weekly Capacity registration table (tis004) with the values set as below.

tis004.efdt	= input date
tis004.prgr	= tis007.prgr
tis004.coca	= tis007.coca
tis004.cogr	= tis007.cogr
tis004.mnth	= tis007.mnth
tis004.dawe	= date in the booking list.
tis004.toca	= disaggregated capacity
tis004.conc	= consumed capacity
tis004.balc	= disaggregated capacity – consumed capacity
tis004.vald	= “Yes”

else if disaggregation is by Manufacturing Center then

Insert the new disaggregated record in Daily Capacity registration table (tcc901) with the values set as below.

tcc901.efdt	= input date
tcc901.coca	= tis008.coca
tcc901.cogr	= tis008.cogr

tcc901.acde = tis008.acde  
 tcc901.mnth = tis008.mnth  
 tcc901.dawe = date in the booking list.  
 tcc901.toca = disaggregated capacity  
 tcc901.conc = consumed capacity  
 tcc901.balc = disaggregated capacity – consumed capacity  
 tcc901.mcal = disaggregated minimum. Allocation capacity  
 tcc901.vald = “Yes

endif

### 9.1.8 Session: Maintain Communication Category by Task (tim003)

In this session, the Communication category by Task are maintained.

#### Screen Layout

Maintain Communication Category by Task		Company : VVV
<u>Task</u>	<u>Comm. Category</u>	
1)FF	2)FFFFFFFF	
1)FF	2)FFFFFFFF	
1)FF	2)FFFFFFFF	
1)FF	2)FFFFFFFF	

Choice : C

*Table 9.19: Maintain Communication Category by Task Screen Layout*

## Screen Fields

SEQ. NO.	SCREEN FIELD NAME	DESCRIPTION	FIELD TYPE	DEFAULT	DISPLAY FORMAT	DISPLAY/ INPUT LENGTH	ZOOM
1	tim003.tan o	Task Number	Input	-	ZZZ9	4	Yes
2	tim003.co ca	Communicat ion category	Input	-	-	12	-

Table 9.20: Maintain Communication Category by Task Screen Fields

### Processing

The information entered in this session is stored in the table tim003. The session allows users to insert, delete or copy the record.

#### 9.1.9 Session: Maintain Manufacturing Centers by item (tim005)

### Description

This session would allow to maintain the manufacturing centers for an item. The manufacturing centers would be maintained as a sequence in the string format. The position of the manufacturing center in the string sequence is the priority of the manufacturing center to manufacture the item.

### Screen Layout

Maintain Manufacturing Centers for items		Company : VVV
<u>Item</u>	:	1) FFFFFFFFFFFFFFFF
<u>Sequence</u>	:	2)
<u>Manufacturing Centers</u>	:	3) FFFFFFFFFFFFFFFF
		Choice : C

Table 9.21: Maintain Manufacturing Centers by Items Screen Layout

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## Screen Fields

SEQ. NO.	SCREEN FIELD NAME	DESCRIPTION	FIELD TYPE	DEF AUL T	DISP LAY FOR MA T	DISPLAY /INPUT LENGTH	ZOO M
1	tim005.item	Item	Input	-	-	16	-
2	tim005.seqn	Sequence Number	Input	-	-	1	-
3	tim005.mcen	Manufacturing Center	Input	-	-	20	-

Table 9.22: Maintain Manufacturing Centers by Items Screen Fields

SEQ. NO.	SCREEN FIELD NAME	FIELD VALIDATION
1	tim005.item	Items having item groups belonging to item group set (FP, AM, SF, PT) are only allowed.
2	tim005.seqn	Check that the following seq. Numbers are used for the item belonging to the item groups in item group set. sequence number from 1 to 5 – FP sequence number 0 – AM sequence number 0 – SF sequence number from 1 to 5 - PT
3	Tim005.seqn	Each manufacturing center code in the sequence entered should be defined in the Manufacturing center table(tcc908)

Table 9.23: Maintain Manufacturing Centers by Items Screen Fields detail

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**Processing**

The session should allow users to insert, modify, delete or copy the record. A separate IGSETs can be defined such that each item group set contains item groups having the same maximum sequence number. E.g. Separate IGSET for item groups identifying “Test” operations, separate IGSET for item groups identifying “Assembly” operations and so on.

**9.1.10 Session: Evaluation of MO against STP (tim004)**

**Screen Layout**

Evaluation of MO Against STP		Company : VVV
Process Date	:	1)FFFFFF
MO Number	From :	2)FFFFFF
	To :	3)FFFFFF
MO Date	From :	4)FFFFFF
	To :	5)FFFFFF
6)FFFFFFFFFFFFFFFFFFFF		Choice : C

*Table 9.24: Evaluate MO against STP Screen Layout*

### Screen Fields

SEQ NO.	SCREEN FIELD NAME	DESCRIPTION	FIELD TYPE	DEFA ULT	DISPLA Y FORM AT	DISPLA Y/ INPUT LENGT H	ZOO M
1	proc.date	Processing Date	Input	System date		10	-
2	mono.f	MO Number From	Input			20	-
3	mono.t	MO Number To	Input	Fmax (\$#)		20	-
4	modt.f	MO Date From	Input			10	-
5	modt.t	MO Date To	Input	Fmax (\$#)		10	-
6	proc.mesg	Processing Status	Display	-	-	20	-

Table 9.25: Evaluate MO against STP Screen Fields

### Processing

This block reads the MOs from the Manufacturing Order table[tim001]. It determines the communication groups through which the production order would pass through, in order to satisfy the quantity. On each communication group so identified, the planned load is calculated based on the manufacturing order quantity. Each Business Line has registered demand for various communication groups. If the balance demand to be consumed is greater than or equal to the planned load, then communication group can fulfill the load. If all the applicable CGs can fulfill the load then the priority of the order is set to "High". If not, then the priority is set to "Low". For order quantity, the supply is checked at various MC/CG combinations. The manufacturing centers

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sequence is determined. This manufacturing center sequence is updated in the MO table. The status of the MO is changed to "Evaluated".

1. Read the MOs from the MO table with status "Proposed" (.most.pr) and within the input MO Number range and MO date range .
2. For each selected MO, Perform the following
  - Depending on the processing date which is in week "N", identify the end date of the next week("N+1")
  - If the revised delivery date is less than the end date calculated of week "N+1" then
 

```
Skip.remote = true
```

Else

```
Skip.remote = false
```

Endif
  - Set Pretest sequence, Preassembly sequence, Assembly sequence and test sequence to blank and update to "+1"(integer value).
  - Perform the Routine "Process the MO"(I/p: MO Number, MO quantity, true, true, Pretest sequence, Preassembly sequence, Assembly sequence, test sequence, tim001.acdt, update, skip.remote ). [*Routine 1.1*] Output is the process successful flag and error message.(This step is for demand consumption)
  - If the process successful flag is false then
 

```
Demand.available = false
```

Else

```
Demand available = true
```

Endif
  - If process.successful then
 

```
Perform the Routine "Process the MO"(I/p: MO Number, MO quantity, False, true, Pretest sequence, Preassembly sequence, Assembly sequence, test sequence, tim001.vddt, update, skip.remote). The output is process successful flag and error message.(This step is for supply consumption)
```

Endif

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- Perform Routine “Update the MO table”. [*Routine 1.2*]
- Commit the changes to the database.

Endfor

The following are the Routines that make the whole design. The routines are numbered such that the number can denote at what level in the design the routine is called.

### Level 1 Routines

*Routine 1.1: Routine “Process the MO”*

(I/p: Input MO Number, Input order qty, consume demand flag, comparison flag, ref Input Pretest sequence, ref Input Preassembly sequence, ref Input Assembly sequence, ref Input Test sequence, action date, multiplier, skip.remote flag

o/p: process successful flag, error message ).

<i>Consume demand</i>	<i>Comparison</i>	<i>Multiplier</i>	<i>Action date</i>	<i>Action</i>
<i>True</i>	<i>Yes</i>	<i>+1</i>	<i>Acceptable date</i>	<i>Planned load shall be compared with balance demand at BL/CG and then consumed</i>
<i>False</i>	<i>Yes</i>	<i>+1</i>	<i>Revised Delivery date</i>	<i>Planned load shall be compared with balance supply at MC/CG and then consumed</i>
<i>True</i>	<i>No</i>	<i>+1</i>	<i>Acceptable date</i>	<i>Planned load shall be then consumed at BL/CG without comparison</i>
<i>False</i>	<i>No</i>	<i>+1</i>	<i>Revised Delivery date</i>	<i>Planned load shall be then consumed at MC/CG without comparison</i>
<b>If the multiplier is negative(-1), the release of supply/demand shall take place.</b>				

**Table 9.26: Evaluate MO against STP Conditions**

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- Set process successful flag to true and abort.processing.order = false.
- Initialize the temporary manufacturing sequences to blank and preferred manufacturing center to blank.(This sequences are different variables than the sequences that are passed to the routine). Let the temporary manufacturing sequences be called temp.pretest.mc, temp.preassembly.mc, temp.assembly.mc, temp.test.mc. Initialize Preferred MC to blank.
- Read the “Routing Data by MO” table(tirou902) for the input MO number in the sequence no (sqno) ascending order and production order no as blank.
- Let the BOM item in the “Routing Data by MO” table be operation item.
- For each selected operation and till abort.processing.order is false,
  - Perform the Routine “Get the routing details for the selected item”. *[Routine 2.1]*
    - If consume demand is true then
      - If abort.processing.order is false then
        - Process successful = true
        - Else
          - Process successful = false
        - Endif
      - Else
        - If abort.processing.order is true then
          - Process successful = false
        - Else
          - Process successful = true
          - Perform Routine “Update the Routing Data by MO table”.
            - *[Routine 2.2]*
          - Endif
        - Endif
      - Endfor
    - If process successful is true then

*(This is to pass the new manufacturing sequence formed for MO evaluation session)*

If comparison is true and consume demand is false then

Perform Routine "Copy the temporary formed manufacturing sequence to input manufacturing sequence". [Routine 2.3]

Endif

Endif

Routine 1.2: Routine "Update the MO table"

- If process successful then

Assign the values as follows

tim001.ptsq = pretest sequence  
 tim001.pasq = preassembly sequence  
 tim001.assq = assembly sequence  
 tim001.tssq = test sequence  
 tim001.most = .most.ev  
 tim001.pifg = .pifg.high

Else

Abort transaction

If demand available then

tim001.vqty = 0  
 tim001.most = .most.ho

Else

Perform Routine "Assign Home Manufacturing center if eligible to operations"

[Routine 1.3]

If assignment successful then

tim001.ptsq = pretest sequence  
 tim001.pasq = preassembly sequence  
 tim001.assq = assembly sequence  
 tim001.tssq = test sequence

tim001.pifg     =.pifg.low

tim001.most     =.most.ev

Else

Abort transaction

tim001.most     =.most.ho

Endif

Endif

Endif

Update the table with the above values.

***Routine 1.3: Assign Home Manufacturing center if eligible to operations***

- Initialize assignment successful = true and pretest sequence, preassembly sequence, assembly sequence and test sequence = blank.
- Read the Routing data by MO for the MO under processing.
- For each record selected that is not a line operation and not a packing operation and till assignment successful = true,

Perform routine “Check if the home MC is a part of the eligible MCs” [*Routine 4.5*].

If yes then

Update the “Routing data by MO” table such that manufacturing center field is updated with the home-manufacturing center.

Depending on the item group set to which the item group of the item belongs to, append the home manufacturing sequence to the applicable manufacturing center sequence.

[For FP IGSET, Test sequence is applicable

For AM IGSET, Assembly sequence is applicable

For SF IGSET, Preassembly sequence is applicable

For PT IGSET, Pretest sequence is applicable]

Assignment successful = true

```

Else
    Assignment successful = false
Endif
Endfor

```

**Routine 1.4:** “Determine the manufacturing sequence to be populated”

- Get the communication category linked to the communication group.
- If the communication category is Wafer test then
  - Pretest sequence (tim001.ptsq) = “Home manufacturing center”
- Else
  - If communication category is Backgrind or Saw then
    - Preassembly sequence (tim001.pasq) = “Home manufacturing sequence”
  - Else
    - If communication category is Assembly then
      - Assembly sequence (tim001.assq) = “Home manufacturing center”
    - Else
      - Test sequence (tim001.tssq) = “Home manufacturing center”
- Endif
  - Endif
  - Endif

**Routine 2.1:** Routine “Get the Routing details for the selected MO”

- Store the input value of the “comparison” flag.
- For each selected task code(.tano) till abort.processing.order is false
  - Restore the input value of “comparison” flag.
  - Select the communication category (tim003.coca) linked to the task code from  
“Communication category by task code” table (tim003)

For each communication category (tim003.coca) selected till  
 abort.processing.order is false,

If consume demand is true then

Perform the Routine “Do demand consumption” [*Routine 3.1*]

Else

Perform the routine “Determine the correct Manufacturing  
 sequence”. [*Routine 3.2*]

Perform the routine “Do supply consumption”(l/p: valid  
 manufacturing sequence). [*Routine 3.3*]

Endif

If consume supply is true then

Comparison flag = false

endif

Endfor

Perform Routine “Form the manufacturing sequence”. [*Routine 3.4*]

Endfor

- Restore the input value of “comparison” flag.

**Routine 2.2:** Routine “Update the Routing Data by MO table”

- Select the Record from the “Routing data by MO table” corresponding to the Input MO, Sequence No and Production Order No.(Production Order No is blank).
- Update the manufacturing center field with the preferred manufacturing center identified.
- If the manufacturing center identified is a subcontractor (manufacturing center of type local or remote) then get the subcont task code corresponding to the home task code from the task code mapping table (tirou903).
- Overwrite the home task code with the subcont task code in the “Routing Data by MO” table for the selected table.

**Routine 2.3:** Routine “Copy the temporary formed manufacturing sequence to input  
 manufacturing sequence”

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- Assign the following values

Input pretest sequence = temp.pretest.mc

Input preassembly sequence = temp.preassembly.mc

Input assembly sequence = temp.assembly.mc

Input test sequence = temp.test.mc

### *Routine 3.1: Routine "Do demand consumption"*

- Sequence id is the 2<sup>nd</sup> digit in the task code.
- Perform the Routine "Do Plan load Calculation" (I/p: tim001.prgr, BOM list item, tim003.coca, seq. id, home manufacturing center code). [Routine 4.1]
- Perform the Routine "Read the demand registered for the BL/CG combination" in the demand table. [Routine 4.2]
- Read the parameter "comparison" to decide whether the demand has to be compared with the load.
- If comparison flag is true then
  - If the demand available  $\geq$  planned load then
    - Consume the demand for the BL/CG combination from the demand table using routine "Update the demand table" [Routine 4.3]
  - Else
    - Abort.processing.order = true
  - Endif
- Else
  - Consume the demand for the BL/CG combination from the demand table using routine "Update the demand table"
  - Endif

### *Routine 3.2: Routine "Determine the correct Manufacturing sequence"*

- Determine the item group set to which the item group of the item that is processed belongs to.

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- If the item group set is “PT” then
  - Valid manufacturing sequence = Input Pretest manufacturing sequence
  - Else
    - If the item group set is “SF” then
      - Valid manufacturing sequence = Input Preassembly manufacturing sequence
      - Else
        - If item group set is “AM” then
          - Valid manufacturing sequence = Input Assembly manufacturing sequence
          - sequence
          - Else
            - Valid manufacturing sequence = Input Test manufacturing sequence
            - Endif

**Routine 3.3: Routine “Do supply consumption”(I/p: input manufacturing sequence)**

Check if the input MC sequence is empty or filled.

- If the input MC seq. is not blank then
  - (This part of the logic is entered if manufacturing sequence is known beforehand. Hence during MOM and EMS and MSA session which would i/p manufacturing sequence this part of the logic shall be executed)*
  - Using the seq. id, get the Manufacturing center eligible for processing from the MC seq.
  - Processing MC seq. = MC seq.(seq. id; 1)
  - Skip MC = blank
  - Perform the Routine “Process the MC seq. for supply consumption”. [Routine 4.4]
  - If consume supply <> true then
    - Abort.processing order = true
  - endif

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Else

*(This part of the logic is entered if manufacturing sequence is not known beforehand. Hence during MEV session which would i/p blank manufacturing sequence this part of the logic shall be executed)*

Check if the Preferred MC variable is blank.

If the preferred MC seq. is blank then

Get the MC seq. entered corr. the item selected (12NC)

and the seq. Id from the "Manufacturing center by item" table (tim005).

Processing MC seq. = selected MC seq.

Skip MC = blank

Perform the Routine "Process the MC seq. for supply consumption"

Else

Processing MC seq. = Preferred MC

Skip MC = blank

Perform the Routine "Process the MC seq. for supply consumption"

If consume.supply  $\diamond$  true then

Skip MC = Processing MC seq.

Get the MC seq. entered corr. to the item selected (12NC) and the seq. id.

Processing MC seq. = selected MC seq.

Perform the Routine "Process the MC seq. for supply

consumption"

Endif

Endif

If consume.supply  $\diamond$  true then

Perform Routine "Check if the home MC is a part of the eligible MCs".

[Routine 4.5]

If yes then

Processing MC seq. = Home manufacturing center

Skip MC = blank

```

Consumption Routine
consumption"
    Comparison flag = false
    Perform the Routine "Process the MC seq. for supply
consumption"
    Comparison flag = true
    If consume supply <> true then
        Abort.processing.order = true
    Else
        Pref MC = Home manufacturing center
    Endif
Else
    Abort.processing.order = true
Endif
Else
    Pref MC = MC selected
Endif
Endif

```

**Routine 3.4: Routine "Form the manufacturing sequence"**

If the abort.processing.order is false then

Depending on the item group set to which item group of the selected item belongs, append the Preferred manufacturing center to the appropriate sequence.

If item group set is PT, then append the preferred manufacturing center to the temporary pretest sequence.

If item group set is SF, then append the preferred manufacturing center to the temporary preassembly sequence.

If item group set is AM, then append the preferred manufacturing center to the temporary assembly sequence.

If item group set is FP, then append the preferred manufacturing center to the temporary test sequence.

Endif

**Routine 4.1:** Routine “Do Plan Load Calculation”(I/p: Order From Funloc, MO item, input Communication Category, seq. id, Manufacturing Center

O/p: planned load)

- Get the communication category details “Conversion factor name”( cnam) and “Communication Group name” (.cgnm) using input Communication category and the sequence id.
- Using the conversion factor name and 12NC(MO item), get the conversion factor from the product link table.
- Calculate the planned load as per the following formula.

$$\text{Planned load on the CG} = \text{Order quantity (tim005.qdr)} / \text{conversion factor.}$$

- Return the planned load

**Routine 4.2:** Routine “Read the demand registered for the BL/CG combination”

- Read the start date of the logistics month in which the action date (date on which demand/supply is consumed/released) lies.
- Get the latest record from the disaggregated demand table corresponding to the *Business Line (tim001.pgr)/communication category (tim003.coca)/communication group/Start date of logistics month/daily weekly date (action date) with valid flag (.vald) as yes.*
- `Balance.Demand.available = .balc`

**Routine 4.3:** Routine “Update the demand table”

- Select the record from the demand table for update corresponding to the **BL/CC/CG/mnth/action date with valid flag as “yes”**

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- .balc        = .balc - (multiplier) \* planned load
- .conc       = .conc + (multiplier) \* planned load

**Routine 4.4: Routine "Process the MC seq. for supply consumption"**

1. Get the length of the processing manufacturing sequence and store it in no.of.centers variable.
2. Set found.center = false
3. For counter = 1 to no.of.centers or till found.center = true,

    Get the manufacturing center for processing from the processing sequence as follows

    Process MC = Processing MC seq.(counter,1).

    Perform the Routine "Check if the manufacturing center is to be skipped for processing."

    [ Routine 5.1]

    If the manufacturing center is not to be skipped then

        Calculate the load on the CG/MC combination using routine "Do Plan load calculation".

        [Routine 4.1]

        Perform Routine "Get the supply registered for the CG/MC combination".

        [Routine 5.4]

        If record found then

            If comparison flag is true then

                Perform the routine "Do Minimum Allocation Check".

                [Routine 5.2]

            If consume supply = true then

                Perform routine "Update the supply table" [Routine

5.3]

                Selected MC = Processing MC

                Found.center = true

            Endif

        Else

            Perform Routine "Update the supply table"

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Selected MC = Processing MC

Consume supply = true

Found.center = true

Endif

Else

Consume supply = false

Endif

Endif

Endfor

4. If consume.supply  $\diamond$  true then

Found.center = false

For counter = 1 to no.of.centers or till found.center = true,

Get the manufacturing center for processing from the processing sequence as follows.

Process MC = Processing MC seq.(counter,1).

Perform the Routine “Check if the manufacturing center is to be skipped for processing.”

If the manufacturing center is not to be skipped then

Calculate the load on the CG/MC combination using routine “Do Plan load calculation”.

Perform Routine “Get the supply registered for the CG/MC combination”.

*[Routine 5.4]*

If record found then

If comparison flag is true then

Perform the routine “Do the Maximum Allocation Check”.

*[Routine 5.5]*

If consume supply = true then

Perform routine “Update the supply table”

Selected MC = Processing MC

Found.center = true

Endif

Else

```

        Perform Routine "Update the supply table"
        Selected MC = Processing MC
        Consume supply = true
        Found.center = true
    Endif
Else
    Consume supply = false
Endif
Endif
Endfor

```

**Routine 4.5:** Routine "Check if the home MC is a part of the eligible MCs".

- Read the "Manufacturing center by item" table (tim005) for the selected operation item.
- Check if the home manufacturing center exists in the selected manufacturing center sequence or not.
- If it does exist then return true else return false.

**Routine 5.1:** Routine "Check if the manufacturing center is to be skipped for processing."

- Get the manufacturing center type.
- If the manufacturing center type is remote then

```

    If skip.remote is true then

```

```

        Skip.mc flag is set to true

```

```

    Else

```

```

        Skip.mc flag is set to false

```

```

    Endif

```

```

Endif

```

**Routine 5.2:** Routine "Do minimum Allocation check"

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If (load.calculated + consumed capacity (.conc)) <= minimum allocation(.mcal) then

    Consume supply = true

Else

    Consume supply = false

Endif

**Routine 5.3:** Routine “Update the Supply table”

- Select the record from the supply table for update corresponding to the CC/CG/MC/start date of logistics month/action date with valid flag as “yes”.
- .balc            = .balc - (multiplier) \* planned load
- .conc           = .conc + (multiplier) \* planned load

**Routine 5.4:** Routine “Get the supply registered for the CG/MC combination”.

- Read the start date of the logistics month in which the action date(date on which demand/supply is consumed/released) lies.
  - Get the latest record from the disaggregated supply table corresponding to the)/communication category (tim003.coca)/communication group/Manufacturing Center code/Start date of logistics month/daily weekly date(action date) with valid flag(.vald) as yes.
  - If the record is present then
    - Record found = true
    - Else
    - Record found = false
- Endif

**Routine 5.5:** Routine “Do maximum Allocation check”

- If load.calculated + consumed.capacity(.conc) <= total capacity(.toca) then
  - Consume supply = true

Else

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Consume supply = false

Endif

## 9.2 Core Tables

The following table lists the tables

SEQ. NO.	TABLE NO.	TABLE NAME
1.	tir902	Routing Data by MO
2.	tis006	Communication Group By Communication Category
3.	tis007	Demand Capacity Registration
4.	tis008	Supply Capacity Registration
5.	tcc908	Assembly Centre
6.	tis015	STP Bucket By Product Group
7.	tis004	Daily/Weekly Capacity Registration
8.	tcc901	Daily Capacity Registration

Table 9.27: Core Tables

## Description of Tables

### 9.2.1 Table: Routing data by MO (tir902)

#### Description

- This table will be used to store the routing for a given MO and SFC order.
- This table contains all the fields of tir002 (Routing) and some additional fields. The details of the additional fields is as follows:

#### Layout

Table: tir902 – Routing by MO

SEQ NO.	FIELD	DESCRIPTION	KEY	TYPE	LEN	MD	RPT	IV	REF. TABLE
1.	mono	MO Number	Y	String	20	Y	N		
2.	sqno	Sequence No.	Y	Integer	2	N	N		
3.	pdno	SFC order No.	Y	Long	4	N	N		Sfc table
12.	bitm	BOM Item	N	String	12	N	N		
13.	citg	Bitem Item group	N	String	6	N	N		
14.	mcsq	Mfg. Center	N	String	1	N	N		

**Legend:** MD: Mandatory Field (y/n), RPT: Repeating Field (y/n), IV: Initial value

Table 9.28: tir902 table Layout

### 9.2.2 Table: Communication Group by Communication Category (tis006)

#### Description

This table will be used to store the information of communication groups and Communication categories.

#### Layout

Table: tis006 – Communication Group by Communication Category

SEQ NO.	FIELD	DESCRIPTION	KEY	TYPE	LENGTH	MANDATORY	REPEATING	INITIAL VALUE	REFERENCE
4.	cogr	Communication Group	Y	String	20	Y	N		
5.	coca	Communication Category	Y	Enum	12	Y	N	Assembly	
6.	basu	Units		String	3	Y	N		
7.	cmba	Communication Group/ Communication Category							
8.	cmbb	Communication Category/ Communication Group							

**Legend:** MD: Mandatory Field (y/n) , RPT: Repeating Field (y/n), IV: Initial value

This material is reprinted from *Table 9.29: tis006 table Layout*, not allowed for commercial use.

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### 9.2.3 Table: tis007 – Demand Capacity Registration

#### Description

This table will be used to store the information of capacities for each month of BL's/CG's. And also effective date for which these registered capacities are available. For all manufacturing center the priority and minimum allocation info. is also stored.

#### Layout

tis007 – Demand Capacity Registration

SEQ NO.	FIELD	DESCRIPTION	K E Y	TYPE	L E N	M E D T	R P	I V	REF. TABLE
1.	efdt	Effective Date	Y	date	8	Y	N		
2.	prgr	Business Lines	Y	long	6	Y	N		tcc901
3.	coca	Communication Category	Y	enum	1 2	Y	N	Assem bly	
4.	mnth	Start date of logistic month	Y	Date	8	Y	N		
5.	cogr	Communication Group	Y	string	2 0	Y	N		tis006
6.	carl	Capacity Reservation for logistic month	N	double			N		
7.	unit	Unit	N	String	3	N	N		tcc001
8.	stat	Status	N	enum	1		N	registe red	
9.	Cmba	cogr/coca	N						tis006

Table 9.30: tis007 table Layout

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### 9.2.4 Table: Supply Capacity Registration (tis008)

#### Description

The following table will be provided. This table will be used to store the information of capacities for each month of MC's/CG's .And also effective date for which these registered capacities are available.

#### Layout

tis008 – Capacity Registration

SEQ NO.	FIELD	DESCRIPTION	KEY	TYPE	LEN	MD	RPT	IV	REF. TABLE
1	efdt	Effective Date	Y	date	8	Y	N		
2	acde	Manufacturing Centre Code	Y	string	1		N		tcc908
3	coca	Communication Category	Y	enum	12	Y	N	Assembly	
4	mnth	Start date of logistic month	Y	Date	8	Y	N		
5	cogr	Communication Group	Y	string	20	Y	N		tis006
6	carl	Capacity Reservation for logistic month	N	double			N		
7	minl	Minimum Capacity Allocation	N	double			N		
8	unit	Unit	N	String	3	N	N		tcc001
9	stat	Status	N	enum	1		N	registered	
10	Cmba	Cogr/coca	N						tis006

**Legend:** MD: Mandatory Field (y/n) , RPT: Repeating Field (y/n),IV:Initial value

This material is reserved for **Table 9.31: tis008 table Layout** allowed for commercial use.

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### 9.2.5 Table: Manufacturing Center (tcc908)

#### Description

This table stores the definition of manufacturing centers.

#### Layout

tcc908 – Manufacturing Center

SEQ NO.	FIELD	DESCRIPTION	KEY	TYPE	LEN	M	R	IV	REF. TABLE
1.	acde	Manufacturing Center Code	Y	String	1	Y	N		
2.	dsca	Manufacturing Center Description		String	30		N		
3.	type	Type		Enum		Y	N		
4.	ccty	Country of Origin		String	3	Y	N		tcc010

**Legend:** MD: Mandatory Field (y/n), RPT: Repeating Field (y/n), IV: Initial value

Table 9.32: tcc908 table Layout

### 9.2.6 Table: STP Bucket By Business Lines (tis015)

#### Description

This table will store the weekly or daily Business Lines.

#### Layout

tis015 – STP Bucket By Business Line

SEQ NO.	FIELD	DESCRIPTION	K	TYPE	L	M	R	IV	REF. TABLE
1.	prgr	Business Lines	Y	Long	6	Y	N		tcc901
2.	type	STP Bucket		Enum	8	Y	N	Daily	

**Legend:** MD: Mandatory Field (y/n), RPT: Repeating Field (y/n), IV: Initial value

Table 9.33: tis015 table Layout

### 9.2.7 Table: Daily/Weekly Capacity Registration (tis004)

#### Description

This table is used for the purpose of disaggregation and is an extension of table capacity registration (tis007). The monthly capacity of Business line info. stored in capacity registration (tis007) table is splitter into daily and weekly capacity using session “Convert Monthly capacity to Daily / weekly capacity” and then stored in this table.

## Layout

### tis004 – Daily/Weekly Capacity Registration

SEQ NO.	FIELD	DESCRIPTION	K E Y	TYPE	LEN	M D	R P T	IV	REF. TABLE
1.	efdt	Effective Date	Y	date	8	Y	N		
2.	prgr	Business Lines	Y	long	6	Y	N		tcc901
3.	coca	Communication Category	Y	enum	12	Y	N	Asse mbly	
4.	cogr	Communication Group	Y	string	20	Y	N		tis006
5.	mnth	Start date of logistic month	Y	Date	10	Y	N		
6.	dawe	Daily or weekly date	Y	date	10	Y	N		
7.	toca	Total Capacity Reservation for a week/day	N	double			N		
8.	conc	Total Consumed capacity	N	double			N		
9.	balc	Total Balance Reserved Capacity	N	double			N		
10.	vald	Valid	N	enum	5		N	yes	

**Legend :** MD: Mandatory Field (y/n) , RPT: Repeating Field (y/n) , IV: Initial value

**Table 9.34: tis004 table Layout**

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### 9.2.8 Table: Daily Capacity Registration (tcc901)

#### Description

This table is used for the purpose of disaggregation and is an extension of table supply capacity registration(tis008). The monthly capacity info for manufacturing center stored in Supply capacity registration (tis008) table is splitter into daily capacity using session “Convert Monthly capacity to Daily / weekly capacity” and then stored in this table.

#### Layout

tcc901 – Daily Capacity Registration

SEQ NO.	FIELD	DESCRIPTION	KEY	TYPE	LEN	MD	RPT	IV	REF. TABLE
1	efdt	Effective Date	Y	date	8	Y	N		
2	acde	Manufacturing Centre Code	Y	string	1	Y	N		tcc908
3	coca	Communication Category	Y	enum	12	Y	N	Assemble	
4	cogr	Communication Group	Y	string	20	Y	N		tis006
5	mnth	Start date of logistic month	Y	Date	8	Y	N		
6	dawe	Daily date	Y	date	8	Y	N		
7	toca	Total Capacity Reservation for a week/day	N	double			N		
8	conc	Total Consumed capacity	N	double			N		
9	balc	Total Balance Reserved Capacity	N	double			N		

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10	mcal	Minimum Capacity Allocation	N	double			N		
11	vald	Valid	N	enum	5		N	yes	

**Legend:** MD: Mandatory Field (y/n) , RPT: Repeating Field (y/n), IV: Initial value

Table 9.35: tcc901 table Layout

**9.3 Reports:**

**9.3.1 Session: Print Short Term Plan**

**Description**

Print Short Term Plan will Print Month wise Capacity Registered for each Business line or Manufacturing Center. Depending on user selection either of two reports

- 1) Print STP for Business Line
- 2) Print STP for Manufacturing Center

will be selected and printed.

**Form Layout:**

Print Short Term Plan

---

Effective Date From : 1) FFFFFFFF  
 To : 2) FFFFFFFF

BL / MC : 3) FFFFFFFFFFFFFFFFFF

Business Lines From : 4) FFFFF  
 To : 5) FFFFF

Manufacturing From : 10)  
 Center To : 11)

Communication From : 6) FFFFFFFF  
 Category To : 7) FFFFFFFF

Communication From : 8) FFFFFFFFFFFFFFFFFF  
 Group To : 9) FFFFFFFFFFFFFFFFFF

Table 9.36 : Print Short Term Plan Report Screen Layout

## Form Fields

SEQ. NO.	SCREEN FIELD NAME	DESCRIPTION	FIELD TYPE	DEFAULT	DIS PLAY FOR MAT	ZOOM
1	efdt.f	Effective Date	Input			Yes
2	efdt.t	Effective Date	Input	2000-12-31		Yes
3	bl.mc	BL / MC	Input	Business Line		
4	prgr.f	Business Line	Input		-	Yes
5	prgr.t	Business Line	Input	999999	-	Yes
6	coca.f	Communication Category	Input		-	-
7	coca.t	Communication Category	Input	Prober	-	
8	cogr.f	Communication Group	Input		-	Yes
9	cogr.t	Communication Group	Input	Max (domain)	-	Yes
10	acde.f	Manufacturing Center	Input		-	Yes
11	acde.t	Manufacturing Center	Input	Max (domain)	-	Yes

Table 9.37: Print Short Term Plan Report Form Fields

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**9.3.1.1 Report Layout: Short Term Plan for BL**

This report prints monthly capacity registered by Business Line for different Communication Groups for a period of six months from the effective date.

Date : WWWWV [V:W] VVVV WWWWWWWWWWWWWW		SHORT TERM PLAN FOR BUSINESS LINE (6 months window from effective date)					Page :
Effective Date : 1) FFFFFFFF							
Business Line : 2) FFF 3) FFFFFFFF							
Communication Category : 4) FFFFFFFF							
Comm. Group	Unit	5)Month1	6)Month2	7)Month3	8)Month4	9)Month5	10)Month6
11) FFF	12)	13) FFFFFFFF.FF	14) FFFFFFFF.FF	15) FFFFFFFF.FF	16) FFFFFFFF.FF	17) FFFFFFFF.FF	18) FFFFFFFF.FF
11) FFF	12)	13) FFFFFFFF.FF	14) FFFFFFFF.FF	15) FFFFFFFF.FF	16) FFFFFFFF.FF	17) FFFFFFFF.FF	18) FFFFFFFF.FF
<b>Total For CC :</b>		FFFFFFF.FF	FFFFFFF.FF	FFFFFFF.FF	FFFFFFF.FF	FFFFFFF.FF	FFFFFFF.FF

*Table 9.38: Print Short Term Plan Report For BL Layout*

- Please note that the report layout is not as per actual dimensions. Please refer to report fields section to get actual field lengths.

**Report fields**

SEQ NO.	REPORT FIELD NAME	DESCRIPTION	ALIGN	FIELD LENGTH	DISPLAY FORMAT
1	tis007.efdt	Effective Date		10	
2	tis007.prgr	Business Line	Left	6	999999
3	tcc901.nama	Description	Left	30	-
4	tis007.coca	Communication Category	Left	9	
5-10	mnth1-mnth6	Months	-	7	mmmyyyy
11	tis007.cogr	Communication Group	-	20	-
12	tis007.unit	Unit	-	3	-
13-18	capa1-capa6	Registered Capacity	-	13	

*Table 9.39: Print Short Term Plan Report for BL Fields*

**Process Logic:**

- Depending on value of field bl.mc (BL/MC) , report to be printed is determined.
- If the “bl.mc” field value is “Business Line” then disable fields “Manufacturing Center From” and “Manufacturing Center To”.
- If the bl.mc field value is “Manufacturing Center” then disable fields “Business Line From” and “Business Line To”.

**Short Term Plan for BL**

- Report based on table “Capacity Registration” (tis007)
- For the specified range of Effective date, Business Line, Communication Category, and Communication Group fetch all records from table tis007 grouped on efdt/BL/CC/CG and sorted on same combination.
- For each selected record, fetch six records from table tis007 with the efdt/BL/CC/CG combination values as the selected record. This would fetch the capacity registered for different months for the selected combination.
- For each record fetched calculate next six months, window being 6 months from the effective date.
- Take only first six records for each effective date and assign values of capacity registered (tis007.car1) for each month to fields capa1 to capa6 corresponding to mnth1 to mnth6, values of other report fields will remain same for all six records.
- There can also be less than six records for each effective date.
- All six records will be printed together as single record on report output.
- Above process will be repeated for all effective dates fetched within selection range.
- A Page Break needs to be inserted at the change of Communication Category, Business Line or Effective date.

**9.3.1.2 Report Layout: Short Term Plan for Manufacturing Center**

This report prints monthly capacity registered and minimum allocation done at a Manufacturing Center for different communication groups for a period of six months from effective date.

Date : WWWWWW [VV:VV] WWWWWWWWWWWWWW		SHORT TERM PLAN FOR MANUFACTURING CENTER (6 months window from effective date)						Page : WW
Effective Date : 1) FFFFFFFF								
Manufacturing Center : 2) 3) FFFFFFFF								
Communication Category : 4) FFFFFFFF								
Comm Group	Unit	5) Month1/ (Min. Alloc)	6) Month2/ (Min. Alloc)	7) Month3/ (Min. Alloc)	8) Month4/ (Min. Alloc)	9) Month5/ (Min. Alloc)	10) Month6/ (Min. Alloc)	
11) FFF	12)	13) FFFFFFFF.FF	14) FFFFFFFF.FF	15) FFFFFFFF.FF	16) FFFFFFFF.FF	17) FFFFFFFF.FF	18) FFFFFFFF.FF	
11) FFF	12)	19) FFFFFFFF.FF	20) FFFFFFFF.FF	21) FFFFFFFF.FF	22) FFFFFFFF.FF	23) FFFFFFFF.FF	24) FFFFFFFF.FF	
11) FFF	12)	13) FFFFFFFF.FF	14) FFFFFFFF.FF	15) FFFFFFFF.FF	16) FFFFFFFF.FF	17) FFFFFFFF.FF	18) FFFFFFFF.FF	
11) FFF	12)	19) FFFFFFFF.FF	20) FFFFFFFF.FF	21) FFFFFFFF.FF	22) FFFFFFFF.FF	23) FFFFFFFF.FF	24) FFFFFFFF.FF	
Total Communication Category : 2)		FFFFFFF.FF	FFFFFFF.FF	FFFFFFF.FF	FFFFFFF.FF	FFFFFFF.FF	FFFFFFF.FF	
		FFFFFFF.FF	FFFFFFF.FF	FFFFFFF.FF	FFFFFFF.FF	FFFFFFF.FF	FFFFFFF.FF	

*Table 9.40: Print Short Term Plan Report For MC Layout*

**Report fields**

Field No.	Table	Field Name	Field Type	Length	Format
1	tis008.efdt	Effective Date		10	
2	tis008.acde	Manufacturing Center		1	
3	tcc908.dsca	Description		30	-
4	tis008.coca	Communication Category	Left	9	
5-10	mnth1-mnth6	Months	-	7	mmmyyyy
11	tis008.cogr	Communication Group	-	20	-
12	tis008.unit	Unit	-	3	-
13-18	capa1-capa6	Registered Capacity	-	13	
19-24	min1-min6	Minimum Allocation	-	13	

*Table 9.41: Print Short Term Plan Report For MC Fields*

**Process Logic:**

- Short Term Plan for MC
- Report based on table “Supply Capacity Registration” (tis008) and “Manufacturing Center” (tcc908)
- For the specified range of Effective date, Manufacturing Center, Communication Category and Communication Group fetch all records from table tis008 grouped on combination (efdt/acde/CC/CG) and sorted on combination (efdt/acde/CC/CG)

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- Fetch Manufacturing Center description from table tcc908.
- For each selected record, select six records from table tis008 to get the capacity registered by the selected communication group on the selected manufacturing center for the six month window, effective date remaining the same.
- For each change of effective date in records fetched calculate next six months.
- Take only first six records for each effective date and assign values of capacity registered (tis008.car1) for each month to fields mnth1 to mnth6, assign values of minimum allocation (tis008.min1) for each month to fields min1 to min6. Values of other report fields will remain same for all six records.
- There can also be less than six records for each effective date.
- All six records will be printed together as single record on report output.
- Above process will be repeated for all effective dates fetched within selection range.
- A Page Break needs to be inserted at the change of Effective date, Manufacturing Center or Communication Category.

#### 9.4 Common Data setup

Common data setup is initial data need to be maintained in prior of starting any process step. The correctness and data integrity is the most important for the common data otherwise will create a lot of problem later. These common data like Item data, Unit, Task, Warehouse, Item Group, Machine and Work Center must be ready in advance.

**List of common tables:**

1	tcc001	Maintain Unit
2	tcc002	Maintain Item Group
3	tcc003	Maintain warehouse
4	tcc004	Maintain Task
5	tcc005	Maintain Machine
6	tcc006	Maintain Work Center
7	tcc902	Maintain Logistic Month
8	tcc901	Maintain Funloc
9	tii001	Maintain Item Data
10	tfg005	Maintain Period

*Table 9.42: Common Tables list*

## **Chapter 10**

### **Summary**

After orders are created with status “Proposed” then evaluation process need to be

The expectation of an organization from demand and supply matching methodology are as below:

- 1) Improve their current working way
- 2) Utilization the existing resources and capacities both inhouse and subcont
- 3) Guarantee to the BLs to get the goods at minimum level as their reserved capacities
- 4) Make customer more satisfaction
- 5) Improve purchasing planning and inventory control
- 6) Minimized order cancellation
- 7) STP histories can be used for medium and long term planning later
- 8) Prevent the fluctuation of orders release from BLs

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## Appendix



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## Appendix A

E-R Diagram

