Dynamic Safety Stock: Calculation and Integration with the planning.

Applies to:
ECC- 6.0. For more information, visit the Supply Chain Management homepage.

Summary
Dynamic Safety Stock scenario can be used to calculate the average fluctuating inventory over a given period. This helps to maintain the optimum amount of inventory levels both for the peak requirements and when there is low demand.

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Author Bio
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# Table of Contents

Introduction ........................................................................................................................................... 3  
Scenario ................................................................................................................................................ 3  
   SAP Mapping ..................................................................................................................................... 5  
   Range of Coverage Profile ............................................................................................................... 5  
   Determining the range of coverage .................................................................................................. 6  
Conclusion ........................................................................................................................................... 16  
Related Content .................................................................................................................................. 17  
Disclaimer and Liability Notice ........................................................................................................... 18
Introduction

The function of Demand Planning is to ensure an optimum supply of inventory throughout. The level of inventory must be maintained such that it’s not surplus & at the same time inventory should not be too short to run into delivery delays. This is to avoid the excessive storage overheads and capital tie ups. Even though MRP helps to streamline the inventory but the input to MRP does not take into account the demand fluctuations. To take the Demand fluctuation into account, Dynamic Safety Stock scenario can be incorporated. This method of planning is based on the precise that there is constant change in the average consumption which can be taken into account by MRP. So every time the MRP is run this change in the average consumption is taken into account in the planning run and as a result the inventory quantities are recalculated.

Scenario

The assumption on which most planning systems are based is that all planning data is deterministic, but in real procurement, production & delivery scenarios various random events occur. A buffer stock in the form of Safety Stock is used to minimize the impact of random events. Normally in materials management there are two basic inventory management systems which are Periodic Review System (P-System) Fixed Order Quantity system (Q-System).

In P system of inventory, the stock position is reviewed once in a fixed period and an order is placed depending on the stock position on that day. Thus the variable factor here is the quantity and the fixed factor is the period. This normally relates with MRP where the MRP is run at fixed interval of time to check the inventory status.
Q system is a system wherein replenishment is done when the stock touches the reorder level which is fixed. Thus the fixed factor here is the stock and variable factor is period. This normally relates to the Consumption Based Planning.

The reorder level is calculated by adding the Safety Stock along with the average material consumption. The level of Safety Stock is based on the accuracy of the forecast. The better the Forecast the lower the level of Safety Stock.
SAP Mapping

In SAP, Dynamic Safety Stock can be used to determine the Safety Stock level if the option of **Define Range of Coverage Profile (Dynamic Safety Stock)** is set in IMG. Dynamic Safety Stock takes into account

- Average Requirements &
- Range Of Coverage

Range of Coverage Profile

The Range of Coverage Profile consists of the parameters which are maintained to calculate the Dynamic Safety Stock. The parameters maintained are based on the number of days for which the material availability is required. The plan also takes into consideration the fluctuations in the requirements.

Here the number of days is taken in the range of coverage for which the material must be available. Subsequently based on this coverage profile system calculates requirements in MRP Evaluations & creates the order proposals.

The quantity value can further be limited by defining the

- Maximum & Minimum Range of Coverage
- The Time Periods in which the range of coverage is valid.

**IMG → Production → Material Requirements Planning → Planning → MRP Calculation → Define Range of Coverage Profile (Dynamic Safety Stock).**
The settings maintained here are at Plant level.

The Dynamic Safety Stock is calculated by the formula

\[ \text{DSS} = \text{Average Daily Requirement} \times \text{Range Of Coverage} \]

**Average daily requirements**

Average Daily Requirement is calculated by the formula

\[
\text{(Requirements in the specified periods) / (Number of days in the total period length)}
\]

For the calculation of the average daily requirements following parameters must be maintained

1. **Period indicator** - This indicator is used to determine the calendar period for which average daily requirements needs to be carried out. Following values can be maintained
   - weeks (W)
   - months (M)
   - periods according to the planned calendar (K)

2. **Type of period length** - This indicator is used to determine the length of the individual periods in detail. Following values can be maintained:
   - workdays
   - calendar days
   - Standard days - if standard days is selected as a period length, the number of days determined per period must be maintained in the field, “No. standard days”

3. **Number of periods** - Here, the number of periods are defined which are used to calculate the average daily requirements.

**Determining the range of coverage**

The range of coverage can be defined for a maximum of three periods and different coverage for each period can be maintained.

To do this, ranges of coverage and the periods in the screen section entitled, “Determine range of coverage”. The range of coverage in each of the three periods can be limited by entering a minimum and a maximum range of coverage. The system checks whether the actual range of coverage (available quantity / average daily requirements) lies below the minimum range of coverage or above the maximum range of coverage. If this is the case, the dynamic safety stock level is recalculated using the information for the target range of coverage.
Dynamic Safety Stock: Calculation and Integration with the Planning.
New Entries: Overview of Added Entries

<table>
<thead>
<tr>
<th>Plant</th>
<th>Coverage profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 Texton Plant</td>
<td>001 5 days for 3 months, then 10 days</td>
</tr>
</tbody>
</table>
Apart from these settings in IMG certain Master Data settings need to be maintained in Material Master. The material is set with an MRP type configured with the selection of the Coverage Profile.

### Change Material 54PCPANEL (Finished product)

<table>
<thead>
<tr>
<th>Material</th>
<th>54PCPANEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant</td>
<td>1609</td>
</tr>
</tbody>
</table>

#### Procurement
- **Procurement type**: E
- **Special procurement**: 
- **Quota and usage**: 
- **Backflush**: 
- **JIT delivery sched**: 
- **Co-product**: 
- **Bulk Material**: 
- **Batch entry**: 
- **Prod. stor location**: 0032
- **Default supply area**: 
- **Storage loc. for EP**: 
- **Stock det. grp**: 
- **Joint production**: 

#### Scheduling
- **In house production**: 1 days
- **GR Processing Time**: 
- **SchedMargin key**: 000
- **Planned Delv. Time**: 2 days
- **Planning calendar**: 

#### Netrequirements calculation
- **Safety Stock**: 
- **Min safety stock**: 
- **Safety time and**: 
- **STime period profile**: 
- **Service level (%)**: 
- **Coverage profile**: DDS
- **Safety time/act cov**: days
In the MRP evaluation, (MD04) – the parameters used to calculate the dynamic safety stock can be checked in the period totals display.

<table>
<thead>
<tr>
<th>Material</th>
<th>54PCPANEL</th>
<th>54PCPANEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRP area</td>
<td>1000</td>
<td>XYZ CEMENT PLANT</td>
</tr>
<tr>
<td>Plant</td>
<td>1000</td>
<td>MRP type</td>
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<tr>
<td></td>
<td>D</td>
<td>Material Type</td>
</tr>
<tr>
<td></td>
<td>FERT</td>
<td>Unit</td>
</tr>
<tr>
<td></td>
<td>PC</td>
<td>PC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Periodseg</th>
<th>Plnd ind.re</th>
<th>Requirement</th>
<th>Receipts</th>
<th>Avail quant</th>
<th>ATP qua</th>
<th>Actual co</th>
<th>St</th>
<th>T</th>
<th>D</th>
<th>M</th>
<th>Min.</th>
<th>Targ</th>
<th>Mini</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/06/09</td>
<td>1,000</td>
<td>0</td>
<td>0</td>
<td>1,000</td>
<td>0</td>
<td>999</td>
<td>9</td>
<td>0</td>
<td>3</td>
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<td></td>
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<tr>
<td>11/01/09</td>
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<td>0</td>
<td>3,000</td>
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<td>150</td>
<td>0</td>
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<td></td>
</tr>
</tbody>
</table>
System Calculation Example

Coverage Profile: DSS (Test)

Period Indicator: M (Month)

For Average Requirements

Number Of Periods: 2

Type of Period Length: 3 (Standard Days)

No of Days per Period: 20

For Standard Days number of days need to be maintained.

Target Range Of Coverage: 2

Change View "Range of coverage profile": Details

Dialog Structure

Plant: 1096 Tekton Plant

Coverage profile: DSS Test DSS

Determine range of coverage

Period indicator: M Month

Determine average requirements

Number of periods: 2

Type of period length: 3

No. of Days per Period: 20

Range of coverage in the first period

Min.  Tgt  Max.  Number of Periods: 2

Range of coverage in the second period

Min.  Tgt  Max.  Number of Periods

Range of coverage in the rest of the horizon

Min.  Tgt  Max.
Now if the requirement for the period is
10/06/2009 – 100 Units
10/27/2009 – 200 Units

The Dynamic Safety Stock will be calculated as per the formula
DSS = Average Daily Requirement * Range Of Coverage

Average Daily Requirement = (Requirements in the specified periods) / (Number of days in the total period length).

Average Daily Requirement = (100 + 200) / (20 * 2)

= 300 / 40

= 7.5 units

DSS = 7.5 * 2

= 15

With these input data run MRP with the following result
10/06/2009. PlOrd. 0000045574/Stck 115 (Plnd Order Qty) 115 (Avail. Qty)
10/06/2009. IndReq VSF 100- 15
10/27/2009. IndReq VSF 200- 15
## Planning Result: Individual Lines

<table>
<thead>
<tr>
<th>Date</th>
<th>MRP e</th>
<th>MRP element data</th>
<th>Reschedule</th>
<th>Rec./req qty</th>
<th>Avail. quantity</th>
<th>Store</th>
<th>Base Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>19/06/2009</td>
<td>Stock</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19/06/2009</td>
<td>POOrd</td>
<td>0600045574/Stck</td>
<td>01</td>
<td>115</td>
<td>115</td>
<td>0002</td>
<td></td>
</tr>
<tr>
<td>19/06/2009</td>
<td>Ind Req</td>
<td>VSF</td>
<td></td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19/06/2009</td>
<td>POOrd</td>
<td>0600045575/Stck</td>
<td>01</td>
<td>200</td>
<td>200</td>
<td>0002</td>
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<tr>
<td>19/06/2009</td>
<td>Ind Req</td>
<td>VSF</td>
<td></td>
<td>200</td>
<td>200</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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By switching to Period Totals view, detailed information is provided.

Here Target Stock & Minimum Stock level maintained by the system is 15 units.

Now in Customizing maintain the values for the fields

Minimum Coverage Period 2 Days
Target Coverage Period 4 Days
Maximum Coverage Period 6 Days

Change View "Range of coverage profile": Details
Average daily requirement = 7.5 Units
System calculates Dynamic Safety Stock as
Minimum Safety Stock Level = 7.5 * 2
= 15 Units
Target Safety Stock Level = 7.5 * 4
= 30 Units
Maximum Safety Stock Level = 7.5 * 6
= 45 Units

After marinating these values in customizing run the MRP which gives the following results

The system always maintains the Target Safety Stock Level which is 30 Units in the case of above example. Depending on the inventory level of the material, the system responds accordingly.

If the stock level is less than Minimum Safety Stock Level then the system creates the procurement proposals to maintain the Target Safety Stock Level.

If the stock level is above Target Safety Stock Level no procurement proposals are generated.

If the stock level is above Maximum Safety Stock Level, the system first checks if procurement proposals are firmed & if they are firmed a exception message is generated.

By switching on to the Period Totals view the system shows the information on all stock levels.
This completes the process of setting & executing the MRP taking Dynamic Safety Stock into consideration.

**Conclusion**

The settings & running the MRP with the DSS are completely a part of the standard SAP system. With this set up of planning run, the planner has a better visibility, control & planning of the inventory for a particular period.
Related Content

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