

Reading Sample

Exception monitoring represents the third pillar in a system of effective materials planning. In this sample chapter you will explore the process of exception monitoring and understand a frame-work of reference for building a method to observe and react to meaningful exceptions.

 **"Intelligent Exception Monitoring"**

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*There is no exception to the rule that every rule has an exception.
—James Thurber*

7 Intelligent Exception Monitoring

Exception monitoring provides immense opportunities to move companies toward becoming “exception-minded organizations.” Within its rich set of exception messages and alerts, you can gain deep insight into your company’s dedication to the plan. With its automatic generation of exception messages, rescheduling proposals, and functions to proactively manage and cure exception situations, SAP’s exception monitoring module provides all functions, processes, and tools to take a huge workload off the planner, buyer, or production scheduler. Intelligent exception monitoring improves performance; avoids disruptions in the process, material, and information flow; and narrows the gap between the plan and what actually happens.

Exception monitoring, in that sense, serves lots of purposes in an organization, but primarily facilitates the planning process and negates the need to look at everything every day, moving your organization toward coming an exception-minded business.

Example

An airline operation with scheduled, commercial flights is an excellent example of an exception-minded business. Everything from flight planning to the safe delivery of passengers to their requested destination is routine and being managed using standard policies. Ground personnel checks passengers into their purchased flights according to standard operation procedures, Air Traffic Control handles all the taxi procedures, routing options, and flight handovers according to a well-designed protocol, and the pilot puts the airplane on auto-pilot after ATC has assigned departure and arrival procedures. Routine operations from A to Z are performed by very well-trained personnel who know every procedure and policy by heart. Only when something out of the ordinary happens—an exceptional situation—will the staff take an action that strays from the general rule. Maybe a passenger doesn't show up for the flight even though his luggage was checked in. Or a weather system pops up on the planned route. As the pilot goes

through the checklist, he finds a faulty part in the aircraft's hydraulic system. The crew got delayed from another flight. These are all exceptional situations that require action off the regular routine activities. And for every exceptional situation, there is a standard plan of action, a standard procedure to cure the exception.

This type of operation should be part of every effective materials planning system. There should be general policies for classes of materials that automate the replenishment process to constantly balance supply with demand according to our goals and guidelines. But if there is a deviation from the plan—and only then—we should be alerted to take action and bring everything back to plan and toward the desired results. This is why it's so important to build the rule set—the policies—first and communicate to everybody in the system what we're striving for. Only then can the system determine what is and isn't an exception. Without such thinking and acting, you're shooting blanks into the dark and managing by chaos. Exception messages become meaningless, and the materials planner gets overwhelmed and frustrated with senseless calls for action.

In this chapter, we want to further explore the process of exception monitoring, detail the prerequisites that make such a system effective, and provide a framework of reference for building a method to observe and react to meaningful exceptions.

7.1 Exception Monitoring in SAP ERP

Monitoring the exception messages present in the SAP ERP system is an important part of an effective system of materials planning. A well-organized monitoring procedure doesn't only provide valuable insight into what works and what doesn't, but it also reduces workload and frees up time for inventory reduction activities, planning, and expediting. Prioritized exception monitoring pinpoints inefficiencies and leads us to problems otherwise hidden and undetected in the process.

Exception messages are generated during the MRP run, which performs a net requirements calculation, generates order proposals, and then attaches messages to supply elements when an exceptional situation occurs. Exception messages relate to many things such as start dates, end dates, inventory levels, structural issues, or lead times. To introduce more structure into the process, SAP has provided exception groups into which exception messages can be collected. When exception messages are grouped, it's possible to monitor exceptions in a priori-

tized way. As you'll see, you can develop a customized system of prioritized exception monitoring using these groups. This is "a day in the life of a tactical materials planner," system that includes step-by-step instructions and guidance as to what exception messages, groups of messages, or exceptional situations to monitor and what actions to take to cure these messages in a specific and customizable order of priority.

We use such a system instead of simply work these messages as they come up because these exception messages lead us to more insight into the workings of our processes. When an exception message appears, it tells us something is broken in the following:

- ▶ Process
- ▶ Behavior
- ▶ Policy
- ▶ System setup

Taking a closer look, it becomes apparent the a materials planner has the biggest leverage point with setting the policy by performing master data adjustments for more optimized and automated replenishment. But this fact isn't always understood very well and therefore not used efficiently. Sometimes the materials planner tries many other things first before thinking about policy. But often, and especially after materials planners are trained on policy setting, they choose another suboptimal way of dealing with exception messages: the relentless adjustment of basic data settings.

As we know, order-based replenishment is a big inhibitor of productivity and automation, because it introduces nervousness and variability into the process. Fiddling around with policy is another one. We're referring here to the often seen urge to change parts (and its policy) on a very frequent basis. Especially for expensive and important parts, it seems like there is no limit as to what some planners think is necessary to persistently update and modify basic data manually on parts, in the hope that sometime and somehow it will work out to their advantage. To change a lot-size procedure or an MRP type six times a month doesn't mean things will get better. It just means that things get blurry and confusing.

In the following sections, we'll outline all of the exception groupings and their associated messages. We'll then discuss the order of preference and priority to work and cure those exceptions.

7.1.1 Exception Groups and Exception Messages

As discussed already, exception messages in SAP ERP are generated by the MRP run. Once created, these messages are categorized into eight groups. SAP has done a great job of sorting and grouping these various messages in the standard delivery. Yet there are many installations where people (consultants and customers, users, and IT personnel) reconfigured the assignment of exception messages to their preconfigured groupings. This might very well serve its purpose and sometimes regroupings make a lot of sense.

Sel.	Ex.	Exception Message
	69	Recursive BOM components possible
1	02	New, and opening date in the past
	05	Opening date in the past
2	03	New, and start date in the past
	06	Start date in the past
	63	Production start before order start
3	04	New, and finish date in the past
	07	Finish date in the past
	64	Production finish after order finish
4	01	Newly created
	42	Order proposal has been changed
	44	Order proposal re-exploded
	46	Order proposal has been manually changed
	61	Scheduling: Customizing inconsistent
	62	Scheduling: Master data inconsistent
	80	Reference to retail promotion
	82	Item is blocked
5	50	No BOM exists
	52	No BOM selected
	53	No BOM explosion due to missing config.
	54	No valid run schedule
	55	Phantom assembly not exploded
6	25	Excess stock
	26	Shortage in individual segment
	40	Coverage not provided by master plan
	56	No requirements coverage
	57	Disc. matl partly replaced by follow-up
	58	Uncovered reqmt. after effective-out date
	59	Receipt after effective-out date
	70	Max. release qty - quota exceeded
	96	Stock fallen below safety stock level
7	10	Bring process forward
	15	Postpone process
	20	Cancel process
	30	Plan process according to schedule
8	98	Abnormal end of requirements planning

Figure 7.1 Exception Groups and Their Exception Messages as Delivered in Standard SAP

More often than not, however, these new groupings aren't based on a good understanding of how SAP ERP exception monitoring works, and then it interferes greatly with an effort to introduce sense, automation, and effectiveness into the exception management process. Next, we'll explain the groupings as they are delivered by SAP. Use Transaction MD06 or Transaction MD07 to open the screen that lists the groups as shown in Figure 7.1.

First of all, the 69 RECURSIVE BOM COMPONENTS POSSIBLE. exception message isn't assigned to any group. A recursive bill of material (BOM) is a BOM that contains the same material (number) in the header as in a line item and therefore can circulate and "dead-spiral" demand. There are rare instances where a recursive BOM might make sense; however, when getting this message, it's a good idea to check on your master data and see if a mistake might have crawled into your BOM setup.

To take action to cure exception 69, investigate the BOM and take out recursive items.

In the following subsections, we'll discuss each of the eight group exceptions in detail.

Group 1 Exceptions – You Missed a Warning to Convert Proposals

Exception messages in group 1 are generated when the date that was determined using the opening period was falling into the past.

As you can see in Figure 7.2, the scheduling margin key (SMK column) is using an opening period of 10 days (in the OP.PD field). The opening date is calculated by subtracting the number of working days in the opening period from the start date of the order. For example the start date of a purchasing requisition might be March 12th. That is the date when the requisition must be converted to a purchase order so that the goods are received on time to fulfill a demand. From that date, the system then subtracts the 10 working days from the opening period (as shown in Figure 7.2) and with it arrives at the opening date of the requisition. So what's the meaning and purpose of the opening date? It simply serves as an extra time buffer to be alerted to the need to convert an order proposal into a fixed supply element. With the opening period, you can define a buffer with which to remind you of an upcoming conversion or start date.

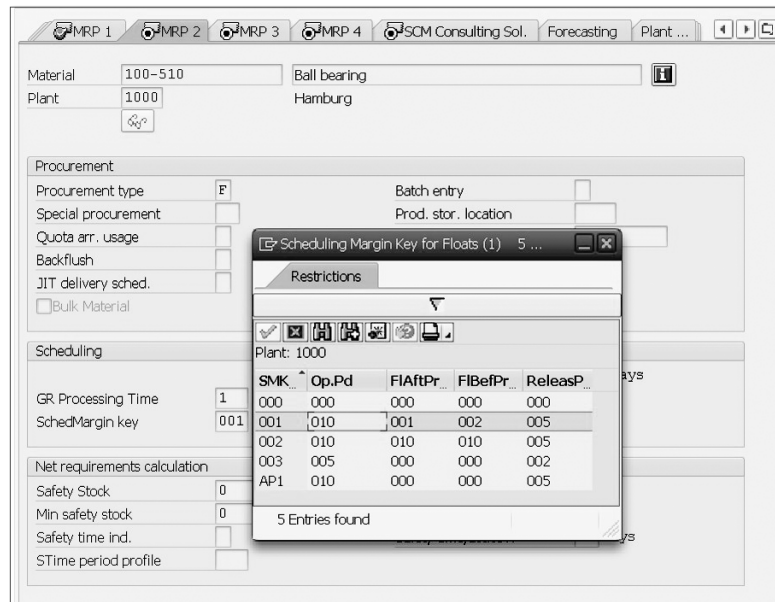


Figure 7.2 Opening Period Defined by the Scheduling Margin Key in the Material Master Record

These are exception messages that don't necessarily have to be included in the daily exception monitor. Look at group 1 messages only once in a while depending on how large of a buffer you've set in the scheduling margin key. Obviously, you don't need to react right away after this message pops up—you still have the time buffer you've chosen through the opening horizon.

So if you're getting exception message 02 NEW, AND OPENING DATE IN THE PAST, you're dealing with an alert telling you that a new order proposal was generated. The requirement is so close that after backward scheduling the replenishment lead time and the opening period, the opening date falls into the past. This doesn't necessarily mean that you're late; you might still have time to convert the proposal on time to meet the requirement. But you're within the time buffer you configured through the opening period.

The other exception message in group 1, 05 OPENING DATE IN THE PAST, simply means that enough time has passed on an existing order proposal, so that the opening date was finally falling into the past.

Group 2 Exceptions – You Missed the Release or Conversion Date of the Order Proposal

This group contains exception messages that inform about missing the release date to convert a purchase requisition or planned order into a purchase order or production order. You can see the release date in Transaction MD04. There are actually two hidden columns—one for the opening date and the other one for the release date as shown in Figure 7.3. If you can't see the START/RELEASE DATE and OPENING DATE columns in Transaction MD04, be sure to make them visible. Move the cursor so that you can see two lines, and then drag the columns open. These columns provide valuable information about opening and conversion dates of your order proposals.

A.. Date	MRP e...	Start/release date	Opening date	MRP element data	Reschedulin...	E... Receipt/Reqmt	Available Qty	Sto...
01.07.2015	IncReq			VSP		2.130-		0
03.08.2015	PlOrd	20.07.2015	06.07.2015	0000051825/stock		1	1	0001
03.08.2015	IncReq			VSP		1-		0
01.09.2015	PlOrd	18.08.2015	04.08.2015	0000051826/stock		1	1	0001
01.09.2015	IncReq			VSP		1-		0
01.10.2015	PlOrd	17.09.2015	03.09.2015	0000051827/stock		3	3	0001
01.10.2015	IncReq			VSP		3-		0
02.11.2015	PlOrd	19.10.2015	05.10.2015	0000051828/stock		3.242	3.242	0001
02.11.2015	IncReq			VSP		3.242-		0
01.12.2015	PlOrd	17.11.2015	03.11.2015	0000051829/stock		1	1	0001
01.12.2015	IncReq			VSP		1-		0
01.02.2016	PlOrd	18.01.2016	31.12.2015	0000051830/stock		6.000	6.000	0001
01.02.2016	IncReq			VSP		6.000-		0

Figure 7.3 Two Additional Columns in Transaction MD04 – Start/Release Date and Opening Date

The release date was calculated by subtracting the lead time from the requirements date (backward scheduling); therefore, it represents the latest date an order proposal has to be started (fixed, converted, a purchase order sent out, a production order sent to the shop floor) so that the material can be received at the required date (see Figure 7.4). If you miss that date, your material might not be received on time, causing your service level to degrade.

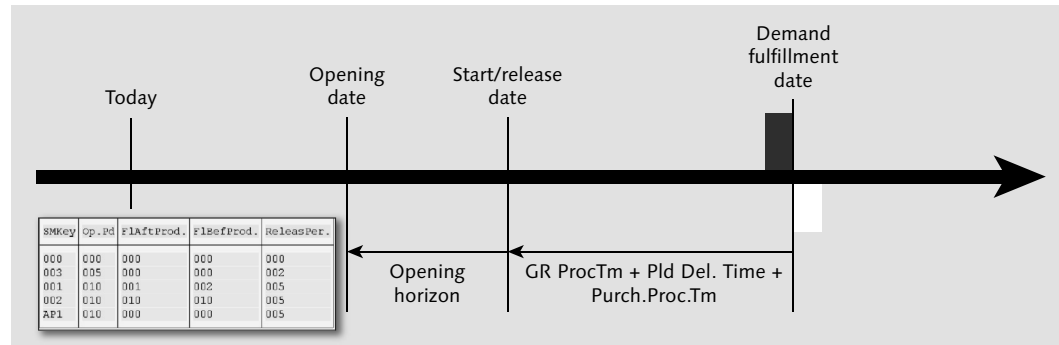


Figure 7.4 Start/Release Date of an Order Proposal

As in group 1, we have an exception that informs us of a new order proposal, 03, and an exception that informs us of an existing order proposal. Only this time, it's the start (or release) date that is relevant. To cure message 03 NEW, AND START DATE IN THE PAST, investigate possible lead time errors in the master data, or look at the availability checking rule, which might have allowed a requirement to drop in within the replenishment lead time. Maybe it was a rush order that was entered manually, ignoring the general rule. You can also use a Customizing setting with which you can tell the system to switch onto forward scheduling from today's date onward, in case the start date falls into the past.

With 06 START DATE IN THE PAST, you deal with an existing order proposal that has missed its conversion date. Maybe your release procedure isn't thought out well, or some order proposals simply fall through the cracks in the selection for a periodic and collective conversion. Whatever may be the case, try to get all these elements up to date and release them on time with the correct lead time, which will determine the correct start/release date. If you feel that the order proposal should be rescheduled instead of released, then your basic data setup is probably faulty and doesn't generate the correct dates automatically.

As for exception 63 PRODUCTION START BEFORE ORDER START, we have a problem in Customizing if you're using lead time scheduling with the MRP run. It tells you that the system has suggested a production start that lies before the order start in lead time scheduling (see Figure 7.5). This happens when you don't select the option to adjust the basic dates in the scheduling parameters for the order proposals (Customizing Transaction OPU5).

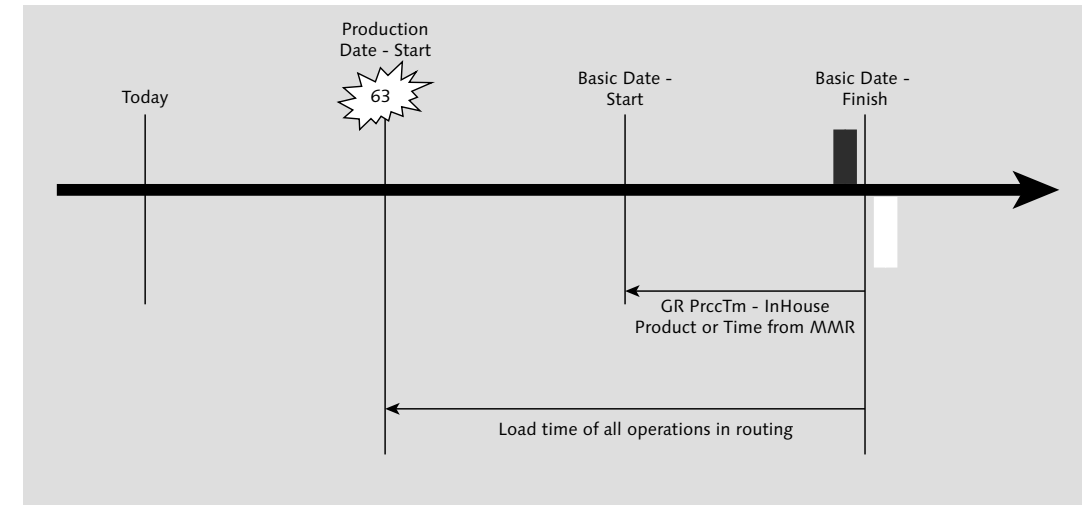


Figure 7.5 Production Starts Earlier Than the Basic Date Start

Think about it this way: if the in-house production time in the material master is shorter than the processing time in the routing, and you perform lead time scheduling where the routing is used for backward scheduling, your production start date will break through the basic start date determined by the in-house production time. That represents an inconsistency in scheduling and needs to be cured. Either customize scheduling to adjust the basic dates, or set the lead times in the master data correctly.

Group 3 Exceptions – Delivery Date Has Passed

Group 3 messages constitute a more serious problem. When it occurs, we know that not only did we miss the start/release date of the order, but we've already passed the finish date as well. With message 04 NEW, AND FINISH DATE IN THE PAST, we're still on the proposal side of things, and the planning run keeps on trying to adjust the proposals to match supply with demand. Dates are being adjusted with the creation of new order proposals, which generates a lot of noise in the planning process. You should prioritize your exception monitoring in a way that running finish dates into the past is kept at an absolute minimum, or better yet, doesn't occur at all.

07 FINISH DATE IN THE PAST is a very critical message because it alerts you of an impending outage, unless you have enough safety stock to get through the demand that's waiting for that order to be received. Message 07 can come from a purchase requisition, a planned order, a purchase order, or a production order. In all cases, you'll have to take action to cure. Under no circumstances should you have orders in the system where the finish date has passed. It actually means that the finish date (or the goods receipt date in the case of a purchase order) lies in the past, and there is no way that you'll receive goods yesterday (see Figure 7.6). Go find those orders and estimate a future delivery date. This might mean that you're curing one exception only to replace it with another (maybe "reschedule in"), but that is why there is a multistep, prioritized system of intelligent exception monitoring. If a passenger missed a flight connection, you might have to place them on a waitlist first before you can route him to the desired destination; it's the same concept.

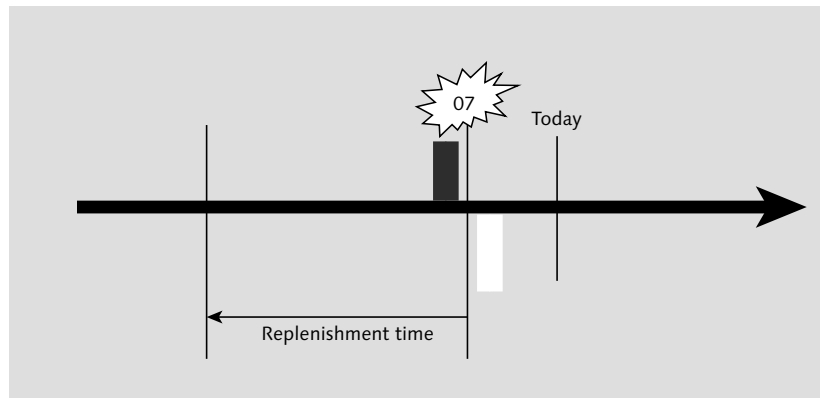


Figure 7.6 Finish Date Fell into the Past

Also part of group 3 for late finishing, is exception message 64 PRODUCTION FINISH AFTER ORDER FINISH, which tells you, again, that there is an inconsistency in scheduling (see Figure 7.7). The production finish, which was calculated using the routings lead time, lies after the basic date (calculated from the material master's lead time). Again, this is because the basic dates aren't adjusted—a setting in Customizing Transaction OPU5. You might also want to check on the correctness of the lead times in routing and the material master record.

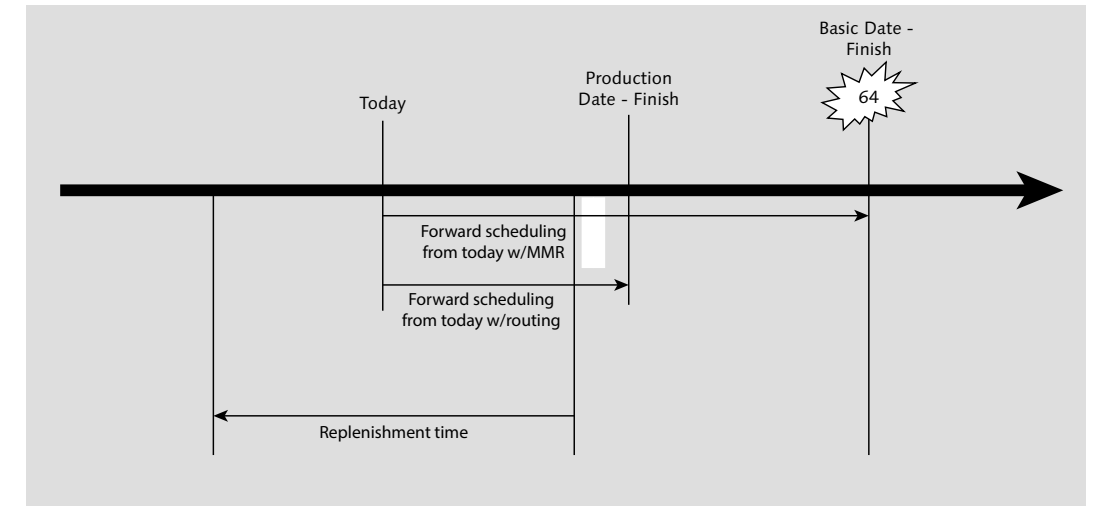


Figure 7.7 Basic Date Finish after Production Finish

Group 4 Exceptions – Information about Changes and Inconsistencies in Customizing and Master Data

Exceptions from group 4 are general messages. These messages don't pose a problem and are of the informative kind. It's important to know that you can only view the exceptions named above in Transaction MD06 (Collective MRP Lists)—not in Transaction MD07 (Collective Stock/Requirements Situation)! This is because the system can't tell when the last planning run was, as the dynamically created stock/requirements situation (in Transaction MD07) has no time stamp and therefore doesn't know what's new. Make sure these messages are part of your Transaction MD06 procedure in the morning. Following is a bit more detail about exception messages in group 4:

- ▶ 01 NEWLY CREATED ORDER PROPOSAL
An order proposal was newly created in the last planning run. This message is generated if there is new demand in the system or when MRP runs using planning mode 3 – delete planning dates.
- ▶ 42 ORDER PROPOSAL HAS BEEN CHANGED
The order proposal was changed in the planning run, either because of a changing demand situation or because of a change in policy that was maintained after the last planning run.

► 44 ORDER PROPOSAL RE-EXPLODED

The order proposal's BOM was reexploded in the planning run, and new dependent requirements were created.

► 46 ORDER PROPOSAL HAS BEEN MANUALLY CHANGED

The order proposal was manually changed in the single-item planning run.

As you can see, these messages are just for general information. There is really not a lot, if anything, you should or have to do to cure these exceptions. They may point to a sales order that was entered yesterday afternoon, or they may show what happens when you switch to a consumption-based planning policy, but they're not critical—unless the creation of a new order proposal also generated another, more critical exception such as 07 FINISH DATE IN THE PAST.

Group 4 also contains some messages dealing with inconsistencies. As you know, your SAP system had to be customized, and master data had to be set up (and is still being adjusted). These settings aren't always done correctly, and sometimes a change in one area causes an inconsistency in another. That is where exception 61 and 62 will help you pinpoint and cure such inconsistencies:

► 61 SCHEDULING: CUSTOMIZING INCONSISTENT

Customizing Transaction OPU5 includes all settings for scheduling order proposals (see Figure 7.8).

You can define scheduling levels, a routing type selection through the selection ID, and parameters for detailed, rate-based, or rough-cut scheduling. If any of these selections conflict with the way the MRP run tries to schedule order proposals, you'll get this exception message, and you'll have to investigate the root cause and get it fixed.

► 62 SCHEDULING: MASTER DATA INCONSISTENT

The system couldn't find a valid routing when scheduling via the routing, or the routing is incorrect. To cure, check the routing for all the scheduling levels, detailed, rate based, or rough cut, set in Customizing in Transaction OPU5.

► 82 ITEM IS BLOCKED

An item could be blocked by quality control.

Figure 7.8 Scheduling Parameters in Customizing

Group 5 Exceptions – Errors when Exploding the BOM during the MRP Run

Group 5 exceptions point to messages resulting from errors in the BOM explosion during the MRP run. When getting message 50 NO BOM EXISTS, there is most likely no BOM existing for the material in question, or, in sales order processing, a sales order BOM could be missing.

And if the MRP run generates a planned order to cover demand, but it can't find a BOM that's fitting for the order, you'll get message 52 NO BOM SELECTED. It could be that there are BOMs assigned to the material, however, the selection cri-

teria can't assign the appropriate one to the planned order. In that case, you'll have to investigate selection procedures and the root cause of the exception by looking at the demand.

If you're running into exception message 53 NO BOM EXPLOSION DUE TO MISSING CONFIG., you'll know that the BOM couldn't be exploded by the MRP run due to missing configuration and customization. This means that line items in the BOM didn't receive dependent requirements, and you must find and cure the problem to plan for the availability of those items.

Message 54 NO VALID RUN SCHEDULE is an exception when using repetitive manufacturing. A run schedule is like a planned order, and the correct quantities couldn't be determined by the MRP run. Investigate selection procedures, scheduling parameterization, and basic data setup in the material master, rate routing, and BOM.

When working with phantom assemblies, you might get message 55 PHANTOM ASSEMBLY NOT EXPLODED. This again might point to incorrect basic data or Customizing settings.

Group 6 Exceptions – Too Much Stock or Too Little Stock

In group 6, you deal with exceptions resulting from an availability check, stock shortages, or excess stock. All messages in this group are related to quantities and stock levels. For example, message 25 EXCESS STOCK is generated by the MRP run when the planned available stock coverage is greater than the maximum stock coverage specified in the range of coverage profile. As you tell the system to not exceed the maximum coverage defined in the range of coverage profile, the MRP run is tasked to keep inventory below that ceiling. However, if there is a rounding value, fixed lot size, or minimum order quantity maintained in the policy, this maximum will be exceeded. That is when exception message 25 can alert you to look further into your stock levels and maybe adjust the policy to produce more effective inventory levels.

If you're using customer individual stock segments to manage individual customer stock, exception 26 SHORTAGE IN INDIVIDUAL SEGMENT will alert you to higher stock levels than what you planned for in a range of coverage profile.

Message 40 COVERAGE NOT PROVIDED BY MASTER PLAN lets you investigate a possible "miss" in planning. The availability check (according to Available-to-Promise [ATP] logic) determined that this requirement isn't covered by the master plan.

When using a planning time fence with fixing types (P2 or P4 in deterministic planning), message 56 NO REQUIREMENTS COVERAGE can alert you of a shortage within the planning time fence.

Message 57 DISC. MATL PARTLY REPLACED BY FOLLOW-UP is used in the discontinuation process. As you can replace a part with a follow-up material in the discontinuation process, you might want to receive an alert if the discontinued part was only partially replaced by the substitute material.

Another exception in discontinuation is message 58 UNCOVERED REQMT AFTER EFFECTIVE-OUT DATE. This message is generated if a requirement exists after the effective-out date for a part that is to be discontinued and therefore can't be covered by planned stock. And if there is a receipt—maybe from a previously generated purchase order, that brings in stock after the effective-out date of a discontinued part, you'll receive exception 59 RECEIPT AFTER EFFECTIVE-OUT DATE. Obviously, these are very helpful alerts to manage discontinuation of parts without interruptions, stock-outs, or leftover, unconsumed stock.

When using quota arrangements, you'll source parts or materials from various vendors with an equal or unequal distribution of required quantities called a quota. For example, you could order a quantity of 100 pieces for the same part from three different vendors with quotas of 50%, 30%, and 20% of the required total quantity. Should the MRP run, for whatever reason, exceed the maximum release quantity of the quote, then you'll be alerted of that fact by exception 70 MAX. RELEASE QTY – QUOTA EXCEEDED.

An exception message that you probably see often is 96 STOCK FALLEN BELOW SAFETY STOCK LEVEL, which informs you that you've dipped into your static safety stock that was set in the MRP 2 screen of the material master record. Looking at Transaction MD04, we can see that the safety stock quantity is subtracted from available stock (Figure 7.9).

A.. Date	MRP e...	Start/release date	Opening date	MRP element data	Reschedulin...	E... Receipt/Reqmt	Available Qty	Sto...
07.02.2015	Stock						128	
07.02.2015	SafeSt			Safety stock		3-	125	
03.03.2014	IndReq			V8F		5-	120	
20.03.2014	PrdOrd			000060003706/PP01	01.09.2014 15	9	129	0001

Figure 7.9 The Use of Safety Stock in Material Requirements Planning

There are a number of things to note here. First, if you never receive this message, then your inventory level is probably too high, and all of the safety stock turns into unused dead stock. So it's a good thing to receive the occasional message 96 because it means that you're making good use of your buffer without binding too much cash in inventory holdings. Also, when a material has exception message 96, its traffic light turns to red, and its DAYS OF SUPPLY turn to -999.9, which means that you can see all materials whose safety stocks are breached on top of your list in Transaction MD07. This might help a great deal in the prioritized management and curing of exception messages. We'll talk more about that in the next chapter.

Group 7 Exceptions – Manual Rescheduling Required

Four exception messages are contained in this group. One is for nonfixed order proposals (30), and the other three are for fixed replenishment elements such as purchase orders and production orders. The latter three are telling you that you must reschedule the orders manually (because they are fixed, and the MRP run doesn't change them anymore), and you'll also receive a suggested date to reschedule to. The four messages are explained in more detail here:

► 10 BRING PROCESS FORWARD

The system suggests bringing the quantities on order in at an earlier time—reschedule in to the rescheduling proposal. This is because a demand date or quantity has changed, and a certain quantity of goods is needed at an earlier time. Instead of creating another order proposal at an earlier time, the MRP run suggests bringing the already-ordered quantities in to an earlier delivery date so they can be used to fulfill the changed demand. The rescheduling has to happen manually, and the process is often called expediting because a vendor will have to be called and asked if they can expedite the delivery to an earlier date, faster than the originally agreed lead time.

► 15 POSTPONE PROCESS

This message tells you the opposite has to happen: we don't need the ordered quantities as early as was originally agreed to. It would be better for us if the vendor can deliver later because the demand has moved out to a later date. If we don't expedite out as suggested by message 15, we'll end up with too much inventory too early, which is bad for business. At the time the order was fixed, it looked like we needed that much, but things have changed and the demand

was moving out, or, as indicated by exception message 20 CANCEL PROCESS, fell off altogether. In that case, you need to ask the vendor to cancel the order altogether. But don't do that before you thoroughly investigate the demand and supply situation and make sure you really don't need those quantities. Following these expediting messages blindly can anger your suppliers and introduce a lot of noise into the replenishment process. That is why you can set tolerances in Customizing for your MRP group as to how many days your MRP run can operate "expediting message free."

► 20 CANCEL PROCESS

This message occurs when a demand is reduced or disappears altogether. This message only appears on fixed supply elements such as a purchase order or a production/process order. At an earlier time, there must have been a demand causing the creation of an order proposal that must have been converted to a fixed supply order. Subsequently, the demand disappeared or was reduced, but because the supply was fixed, the MRP run can't delete the order. However, it can then attach a note (exception message 20) to inform the planner that this receipt isn't needed anymore.

► 30 PLAN PROCESS ACCORDING TO SCHEDULE

The MRP run isn't able to fulfill the demand because, according to master data or routing settings, the lead time is too long for it to bring it in on time.

As you can see in Figure 7.10, the demand date lies within the replenishment lead time, and it's therefore not possible to bring the part in early enough to meet the demand. Expediting is necessary.

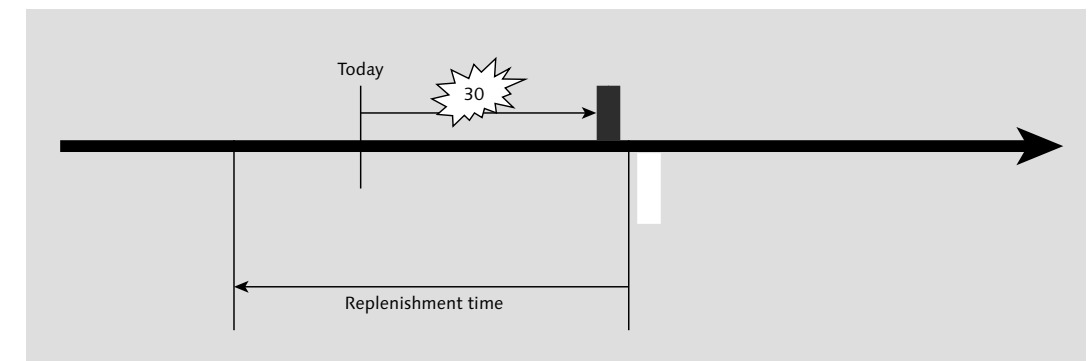


Figure 7.10 Exception 30 Plan Process according to Schedule

Group 8 Exceptions – The MRP Run Ended Because Master Data Settings Do Not Allow for Planning

As with group 4, messages out of group 8 can't be seen in Transaction MD07 but only in Transaction MD06 (see Figure 7.11). If the planning run was terminated for a material, message 98 ABNORMAL END OF REQUIREMENTS PLANNING pops up.

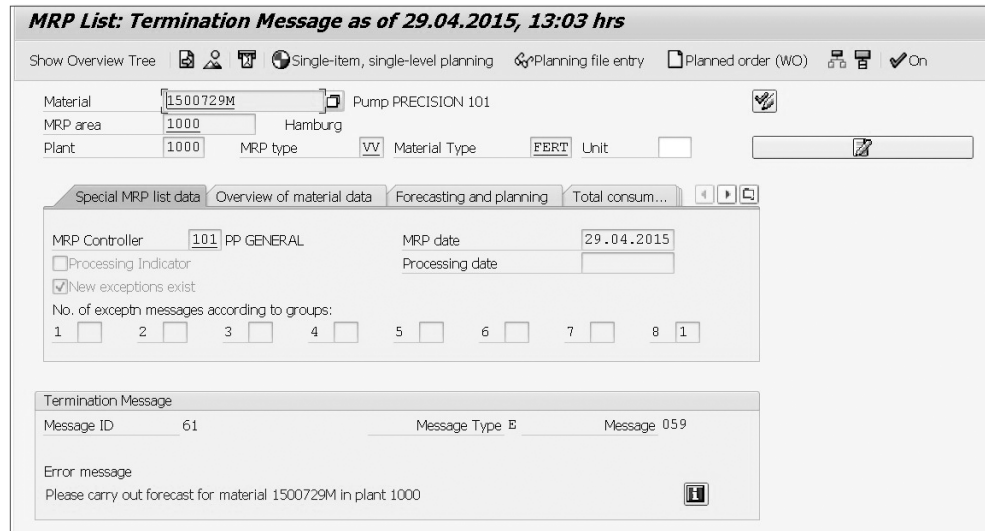


Figure 7.11 Abnormal End in Transaction MD06

7.1.2 Prioritization of Exception Groups and Exception Messages

So what's the sense in grouping these exceptions? The grouping simply prioritizes the workload for the exception handler when he calls up Transaction MD06 in the morning or Transaction MD07 later in the day. Although it may be different from customer to customer, find your own system and adjust it as you go and see fit, but try to avoid every planner developing his own system. Within one organization, or at least within one plant code, there should be a standardized way on how to go about exceptional situations.

Let's first summarize the exceptions discussed in Section 7.1.1 in Table 7.1.

No.	Message Description	Remedies and Actions to Take	Importance
03	NEW, AND START DATE IN THE PAST	The requisition is scheduled to start in the past. High potential that this order will need to be expedited or that the demand can't be supplied!	Critical
04	NEW, AND FINISH DATE IN THE PAST	The requisition is scheduled to finish in the past. High potential that this order will need to be expedited or that the demand can't be supplied!	Critical
06	START DATE IN THE PAST	The order or requisition is scheduled to start in the past. High potential that this order will need to be expedited or that the demand can't be supplied!	Critical
07	FINISH DATE IN THE PAST	The order is scheduled to finish in the past. High potential that this order will need to be expedited or that the demand can't be supplied!	Critical
10	BRING PROCESS FORWARD	Order or requisition is too late to cover requirements. Review and reschedule appropriately.	Important
15	POSTPONE PROCESS	Order or requisition is too early based on requirements. Review and reschedule appropriately.	Important
20	CANCEL PROCESS	Supply is beyond total demand in the system. Stock not required! Review and replan appropriately.	Critical
26	SHORTAGE IN INDIVIDUAL SEGMENT	There is material in the "Provided to vendor" bucket in SAP. Remove the material using Transaction MB1B, and run MRP manually.	Critical
52	NO BOM SELECTED	SAP was unable to find a valid BOM for the item. Check the BOM, production version, and selection method.	Error
53	NO BOM EXPLOSION DUE TO MISSING CONFIG.	Plant set up incorrect. Contact the helpdesk to report this error.	Error

Table 7.1 Exceptions Summary

No.	Message Description	Remedies and Actions to Take	Importance
58	UNCOVERED REQMT AFTER EFFECTIVE-OUT DATE	System unable to find replacement material. Review the run-out strategy, and adjust master data appropriately. Run MRP manually once resolved.	Critical
59	RECEIPT AFTER EFFECTIVE-OUT DATE	Receipt of discontinued material planned. Review the run-out strategy, and adjust orders appropriately. Run MRP manually once resolved.	Critical
62	SCHEDULING: MASTER DATA INCONSISTENT	Check master data! Remove IN HOUSE PROCESSING TIME from the material master MRP 2 view. Ensure that the PRODUCTION VERSION and ROUTING are correct. Run MPS/MRP manually once corrected.	Error
82	ITEM IS BLOCKED	The requisition has been manually blocked and therefore can't be converted. Remove the block from the requisition, or delete the requisition and run Transaction MD02 for the material to regenerate.	Critical
96	STOCK FALLEN BELOW SAFETY STOCK LEVEL	Supply plan insufficient to cover safety stock requirement. Review and adjust if appropriate.	Informative

Table 7.1 Exceptions Summary (Cont.)

When dealing with exception messages, prioritize in the following way:

1. Group 8 is the most important of all the groups, so look at the abnormal ends first. You don't want to have any materials in your portfolio where the planning run aborts. Clean those out first.
2. Next, look at group 5. These are concerning structural problems, and the planning run can't even come up with a date or quantity because the demand doesn't get exploded down to the lower level.
3. Then check out group 3. Not only did you miss a date to firm a receipt, you're so far behind that you missed the date when the receipt was supposed to come in to fulfill a demand.
4. After that, you'll have to deal with the group 2 problems where you missed the date when a proposal needed to be firmed, so that you can receive the quantity

after the regular lead time. If you miss that date, rescheduling and manual expediting is your only option.

5. Group 1 exceptions are only relevant when you use an opening horizon and if you want to have an additional check where your external procurement is triggered first by a planned order and then by a purchase requisition. Therefore group 7 messages ought to be tackled next. These require expediting and may take much more time to get through, but in the least, create a list at this point. The list can be worked off later in the day (call vendors, check with purchasing, look at the warehouse for inventories, etc.).
6. Next deal with group 6. Inventory excess or shortages usually require a change in strategy and that can't be done on the fly or in the morning during an exception-handling session. Again, make a list and see if you can reduce these exceptions over time, applying a different MRP type, changing the lot-size procedure, looking at safety stock levels, and a lot more.
7. Last but not least, you have to look at the general messages in group 4. Why is there a new proposal? Why have these been changed? These messages are information only and don't necessarily require action.

As you reduce your exceptions (you'll never be able to rid yourself of all of them), you'll find all kinds of problems in the process, the master data setup, the system setup, or with human behavior. You'll get yourself into a more analytical mode of operandi and proactively solve issues rather than work transactionally and constantly try to put out fires. It's a very worthwhile exercise to learn about all exception messages and their purposes. Don't waste your time trying to regroup and reinterpret what SAP has already figured out for you.

7.1.3 Fixing the Root Cause Instead of Expediting the Problem

If we think about an airline to describe a superior system of intelligent exception monitoring, we can clearly see that if they operate any less than outstanding and near perfect, world travel would be much worse and downright scary. The question is, then, why do we allow less than perfect dealings with exceptional situations in our business. Maybe we do so because it's not life threatening. Although that's a good point, our motivation to get better shouldn't be driven off life or death decisions only. Of course, there is the aspect of cost. Airlines spend a lot of money on security procedures and operations science research. That research, not only from airlines, is freely available for your perusal. Have a look at it and

take from it what works for you. It doesn't cost anything but is time well spent if your materials planning system is profiting from it. And who wants to be anything but great in their job, right?

Along those lines of thinking, there isn't enough training, coaching, and support that today's materials planners can fall back on. Usually, after an SAP implementation, the user is trained on how to use transaction A and how to use transaction B, and then they are left to their own devices and expected to develop their own system of how to plan for materials availability. The only input they will receive from management is, "Don't hold too much inventory, "Don't starve the production lines," and "Our customers will make or break our business, so do whatever they need to have done."

There you have it, materials planner, go on and be excellent. Now, as we all come from different backgrounds, different education, and different mindsets, we'll all design different systems to deal with the various situations that come at us. Of course, there will be discussion, bouncing off of ideas, brainstorming, and probably a lot of Excel spreadsheets.

The basic idea behind this book, however, is to standardize the approach to materials planning and, because exception monitoring is part of it, to build a standard model on how to monitor and handle exceptional situations. The next section details an example of such a system with its individual components.

7.2 Building a Monitoring System for Exceptional Situations

To build an effective system to manage exceptional situations, you first have to define what the expected, standard result is. Only then can you know what an exception to the rule is. If the pilot has never seen an approach chart for Newark (EWR), how would he know that strong winds from the southeast would pose an exception and require landing on the short runway? There need to be basic procedures in place, guidelines to adhere to, and, most importantly, good policies in place to generate meaningful exceptions.

The second part of a system of exception monitoring deals with a set of standardized actions to be taken to cure the exceptions and get everything back on track. It's here where some experience, creativity, and common sense are needed.

Exception monitoring isn't part of planning. Planning has ended before we get to do exception monitoring. Now we're in a phase of the replenishment process where the exception message indicates a deviation from the plan that requires action from the materials planner. This is where a good materials planner separates himself from the rest.

Finally, we need to periodically evaluate whether the exceptions occur so regularly that at one point in time, they represent the rule. In that sense, exception monitoring is a circle of continuous optimization of the materials planning process and needs to get the attention it deserves.

One of the more important points to consider is how, when, and in which mode you run MRP. We discuss these points in the next section.

7.2.1 How to Initiate the MRP Run

What the engine is for a sports car, the MRP run is for materials planning. It usually runs during the night, delivering a vast amount of information, order proposals, adjustments, and exception messages for us to use in the morning. It balances supply and demand, detects shortages and surplus, makes suggestions, and warns us of impending problems. It's undoubtedly the heart and soul of any MRP and supports automation, provides transparency, and takes over the heavy lifting from the materials planner. The MRP run needs to be set up and coordinated in a joint effort between the planning department and IT. There are many options on how the MRP run can be run. Periodicity, run type, and run parameters have to be discussed, understood, and decided upon for the MRP run to deliver good results.

Periodicity of the MRP Run

In terms of periodicity, most companies decide to run MRP just once every 24 hours, usually overnight. As MRP operates with daily increments (its shortest time unit is "date"), and generally speaking, it doesn't make much sense to run it more than once a day. Very often people argue that a sales order that is entered at 2 p.m. in the afternoon needs an MRP run to have a planned order generated so that the sales requirement can be fulfilled right away. Nothing could be further from a sense-making business procedure. If a sales order that doesn't find available inventory at 2 p.m. can make a customer happy when the MRP run gen-

erates an order proposal at 2:30 p.m., then your organization is also capable of delivering finished product from that production order—maybe by traveling through a wormhole and fixing the supplier lead time.

No, it doesn't work this way. If the product is made-to-stock (MTS), the MRP run doesn't need to create an order proposal, unless there's a shortage, but then the MRP run has time to adjust the plan because the customer is told to wait. If the product is made-to-order (MTO), then the customer will have to wait anyway... as long as the total replenishment lead time (TRLT). In that case, there's no need to create an order proposal at 2:30 p.m., but it can wait until the next day (unless your TRLT is less than a day, in which case, you should use assemble-to-order [ATO]). In assembly processing, the MRP run isn't needed to generate an order proposal. The sales order will do it directly and automatically as part of the process. When the product is promised and manufactured as ATO, any required quantities in a sales order item will immediately generate a planned order, production order, or repetitive order that can be checked for capacity availability and be directly placed in the production program.

The other question is the following: Should you run MRP in longer intervals than 24 hours? That choice greatly depends on your business environment. Naturally, if the smallest planning unit in MRP is one day, and you run MRP once a week, you might miss an adjustment, an exception message, or a necessary order proposal by six days. Most companies run MRP at night when it doesn't occupy processing resources and provides new results readily available first thing in the morning. That, of course, isn't the case if you're operating globally. If you're headquarters in Tennessee start the run at midnight, then the China plant is planned after 1 p.m.

If you're concerned about runtime, you can always get the Business Suite on SAP HANA, which can make your MRP run ten thousand times faster than before. All these concerns about speed, frequency, and runtime are valid, but far more important is a good setup based on solid understanding of the process and what it can do for you.

Don't apply more technology, buy more tools, or run the MRP run more frequently in the hopes of fixing your problems. Include the MRP in the overall system and make it work the way it's supposed to run.

The Type of MRP Run

You can start the planning run in two different ways. Depending on which of the following you choose, the system selects the materials that ought to be planned:

- ▶ **Regenerative run (NEUPL mode)**
All materials in the planning file are planned.
- ▶ **Net change run (NETCH or NETPL mode)**
Only materials that have received MRP-relevant changes since the last MRP run are planned.

To understand these modes of planning, think of a reservation agent with United Airlines. As ticket reservations are received, flights are being filled with passenger reservations on a predetermined flight operations plan. If everything goes well and the weather holds, these flights will take off and land with all those passengers at the planned departure and arrival times. When, however, variability happens and a storm comes in, there will be a lot of rerouting, reshuffling, and cancellations.

There must be some sort of program that airlines use to help them automatically find and book tickets on alternate planes to get the passengers to their destination through an alternate route. They likely don't run that program for every passenger on every flight but only when there is a need for it. In the same way, you can think about net change planning. You only run it on those materials that need planning, and you leave the others alone. The real advantage with net change planning is that the planning run creates MRP lists only for those materials it plans. When you call up the collective list of MRP lists (Transaction MD06) with the date of last night's run, then you'll get a list of only those materials that are of interest to the planner who manages exceptions.

Like the reservation agent, you don't want to look at every ticket every day.

Setting Up the MRP Run

The MRP run, as discussed before, usually runs at night using a batch job so it starts automatically with predefined settings. That batch run can be executed for the entire company using a sequence with which it runs plant by plant in the mode we discussed before. In Figure 7.12, you can see a customized sequence depicting the order in which to run the individual plants.

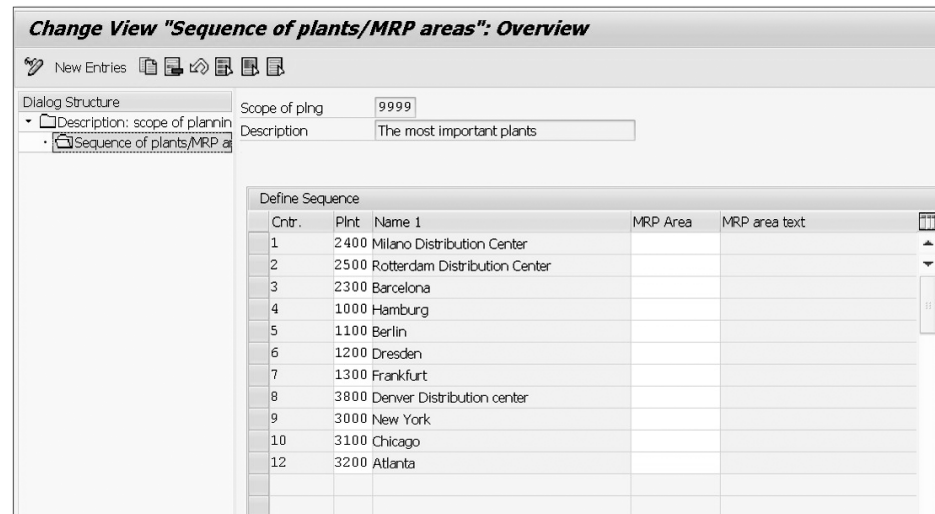


Figure 7.12 Customizing the Sequence of the MRP Run

In the sequence, you might find it necessary to run certain plants multiple times because stock transport orders request and deliver product and parts from other plants in the same network of operations. In that case, a plant might place a demand on another plant, and the first plant might have to be planned again after it receives yet another demand within the network. The effective setup of the sequence of MRP planning runs requires some thinking and needs to be set up carefully.

But the automated, nightly batch run isn't the only way to start the planning run. You might also use one of the online transactions to start it manually:

- ▶ Transaction MD01 runs across the entire plant—but only one, specific plant—and explodes any BOMs if there is a demand for the product. SAP calls this multilevel planning.
- ▶ Transaction MD03 runs MRP for one specific product and explodes its BOM (multilevel planning), or you use Transaction MD03 to plan for exactly one material with the explosion of the BOM (single-level planning).

In either one of these transactions, you'll have to set parameters in the initial screen to control how the run is being carried out.

You can use these transactions by calling up the respective transaction code, or you can configure a transaction call from, let's say, Transaction MD04. This is

very helpful when you analyze a material, change its policy, and then like to see the results it will produce. Figure 7.13 is an example screenshot from Transaction MD02.

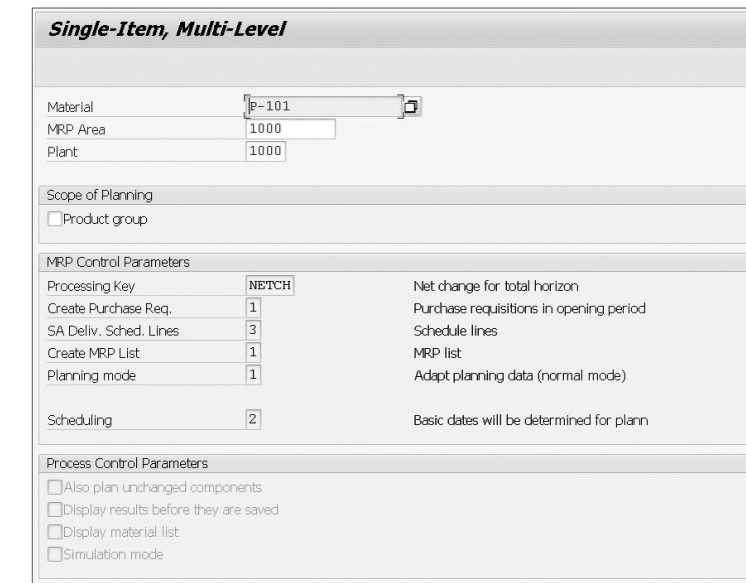


Figure 7.13 Starting the MRP Run Manually with Transaction MD02

The parameters you need to set are in the MRP CONTROL PARAMETERS section. We already discussed the first one, PROCESSING KEY, which is set to NETCH for net-change mode. The second parameter CREATE PURCHASE REQ. determines in which planning horizons the run is generating purchase requisitions. You can limit this to an opening period, and outside of the opening period the MRP run creates planned orders.

The parameter SA DELIV. SCHED. LINES handles the automatic generation of schedule line items for a scheduling agreement if one exists for an item being planned.

Whether to create an MRP List or not is defined in the parameter setting for CREATE MRP LIST. The MRP list is a snapshot in time of the stock requirements list and can be generated by the MRP run right after its done planning for each item. MRP lists can be viewed with Transaction MD05 and Transaction MD06.

The PLANNING MODE setting controls how the system deals with procurement proposals (planned orders, purchase requisitions, scheduling agreement lines)

from the last planning run, which aren't yet firmed, during the next planning run. Usually, the master plan is adjusted in the planning run to adapt it to either new dates or new quantities. If a requirements quantity is increased, the system automatically adjusts the quantity of the corresponding procurement proposal. If changes are made in the BOM or material master, the planning mode controls whether or not these changes will have an effect in planning. There are three possible settings for planning mode in the initial screen of the planning run:

► **Planning mode 1**

The run doesn't re-create but rather adjust the existing procurement proposal. Changes in date and quantity, changes in demand, and changes to lot-size procedure and/or MRP type are adjusted. The run only explodes BOMs for order proposals that were adjusted, which greatly improves system performance and helps reduce the amount of new order numbers.

► **Planning mode 2**

The system reexplodes the BOMs for all existing procurement proposals that aren't firmed and also for those for which the dates and quantities don't have to be adjusted.

► **Planning mode 3**

Existing procurement proposals that aren't firmed are completely deleted from the database and re-created. The system then reexplodes the BOMs. We use this mode when testing a new policy to make sure that everything that was changed is considered during the planning run. However, it isn't recommended to use this planning mode in mass planning because it will soon exhaust your order number range.

The last parameter SCHEDULING has two settings. Either the MRP run schedules using the basic dates, or it performs lead time scheduling. In the latter, the routing is used for scheduling, and besides a more detailed scheduling result, the MRP run can also generate capacity requirements for the planned orders. That has the added advantage of you being able to perform capacity planning, sequencing, leveling, and scheduling with planned orders.

7.2.2 Exception Cards

Within our system of effective materials planning, you can use standardized action sheets to document specific exception messages and suggest procedures to fix the situation. We call these notes exception cards, on which you can describe

the conditions that cause the generation of the specific exception such as a missed conversion date, failed delivery, or a dip into safety stock. You can also list the actions that can be taken to take care of the situation and provide a graphic that gives deeper insight into the problem to avoid the exception in the future.

In Figure 7.14, you can see an example of an exception card for exception message 10 (reschedule in), which is assigned to group 7.

EXCEPTION GROUP	DISPLAYED
7	MD06 / MD07 MD05 / MD04

EM# 10

RESCHEDULE IN

This exception message occurs when quantities in fixed order need to be received earlier than planned. In the rescheduling check of the MRP run the system calculated a date to which the receipt is to be brought forward (rescheduledin) to avoid a material shortage.

ACTIONS TO TAKE

- ✓ Check if the receipt can be brought forward
- ✓ In case of a purchase order call supplier
- ✓ In case of a production order inquire with the scheduler

The rescheduling date that is displayed is the date on which the receipt has to be available for MRP. This includes the goods receipt processing time

Figure 7.14 Example of an Exception Message Card for Exception Number 10

Different companies require different procedures on how to deal with certain exceptions. That is why it might be advantageous to develop a set of exception cards and distribute them among planners. It helps to standardize the system, keep the portfolios clean, and lower the amount of exceptions you're dealing with.

7.2.3 Monitoring Exception Messages

Exception messages are displayed primarily in four transactions:

- ▶ Transaction MD04 to display the dynamically created stock requirements situations for an individual material
- ▶ Transaction MD05 to display the MRP list, a snapshot from the time when the MRP run last planned the material
- ▶ Transaction MD06 to display a collective list of materials with their respective MRP lists
- ▶ Transaction MD07 to display a collective list of materials with their respective stock/requirements situations

These four transactions make up the monitoring system you have available in standard SAP ERP. Using them correctly and knowing what information each of these can provide is essential for a good monitoring system. In the following subsections, you'll learn how to use and apply stock/requirements situations, MRP lists, and collective displays to sort, filter, and prioritize exception messages for effective materials planning.

But first, we want to make clear the difference between Transaction MD06 and Transaction MD07 (or Transaction MD05 and Transaction MD04).

The Difference between Transaction MD06 and Transaction MD07

The difference between Transaction MD06 and Transaction MD07 is an important one and, if understood and correctly applied, can make a world of a difference in the way you monitor your exceptions. Transaction MD07 is a list of dynamically generated stock/requirements lists as they represent themselves right at the moment you call it up. Transaction MD06 is a collective list of snapshots of what the stock requirements list looked like at the very moment when the MRP run created it. If you enter Transaction MD06 with a date, then you'll only get the

items touched by the MRP run on that date. Therefore, Transaction MD06 should be run if you have a daily monitoring process in place. Of course, you should start the process first thing in the morning (otherwise you get outdated MRP lists) so that you only look at those items that were planned since yesterday's planning run—and not the entire portfolio.

Don't forget to enter the Transaction MD06 with today's date (if NETCH MRP runs after midnight). That way, you're presented with a list of items that were planned this morning—and nothing else.

Transaction MD07, on the other hand, is the transaction to use throughout the rest of the day because it's always current and dynamically built every time you look at the situation. There is a REFRESH button in Transaction MD04 (the transaction that pops up when you double-click on an item in the list display of Transaction MD07), and even though you can view exception messages there, it's not the primary transaction to *monitor* exceptions. Also note that in Transaction MD07, you won't receive any messages related to newly created proposals or abnormal ends (usually found in groups 4 and 8). These are only visible in Transaction MD06/Transaction MD05.

Transaction MD06 and Transaction MD07 are both important transactions in their own right. But they do different things, and you'll have to understand their meaning to use them the right way for utmost efficiency in your planning and monitoring process.

Working with Transaction MD07

In Transaction MD07, you get a complete list of all materials assigned to your MRP controller portfolio. That list has, among other information, red, yellow, and green traffic lights. The materials are usually sorted that way: red lights first, then yellow, then green (you can change that sorting sequence) specifying where a material falls in terms of its stock days of supply. Therefore, you can see at a glance where you fell short in delivering and where you carry too much stock. That is very good information for your daily monitoring. You could use Transaction MD07 at any time of the day (remember, it's a dynamically created, current stock requirements situation) and take a quick look at red lights (dangerously low inventory) or do something about your green lights (inventory reduction).

So Transaction MD07 doesn't really represent your exception monitor. Despite the fact that it shows exception messages and you can sort your list by them, it's not a good transaction to monitor exception messages because it lacks focus for effective tending to exception messages. Transaction MD07 with its complete list of all materials assigned to an MRP controller key is an excellent transaction to find outdated elements that are in the way of the MRP run being able to generate meaningful exception messages. To use Transaction MD07 for housecleaning, go into the list, and click on the binoculars icon as shown in Figure 7.15.

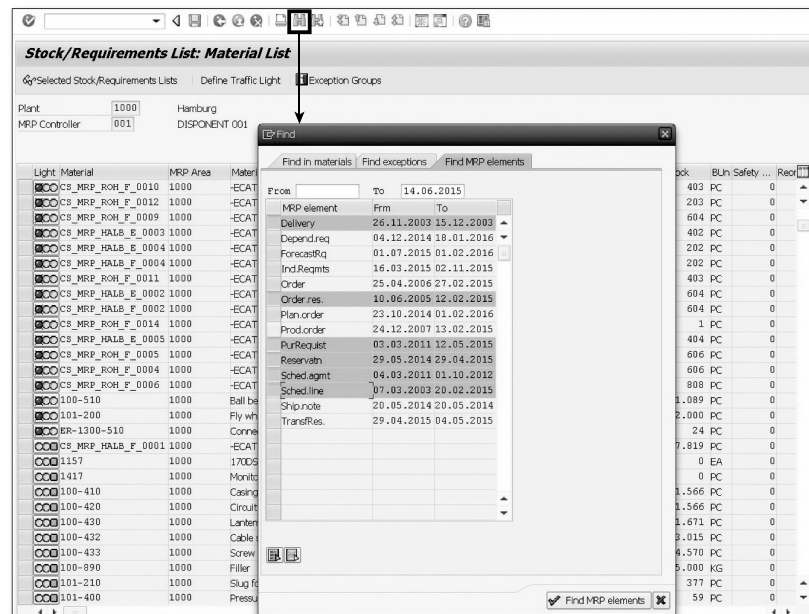


Figure 7.15 Finding Outdated Elements*

Full-Color Figures

Full-color versions of figures marked with an asterisk (*) are available in the supplemental downloads for this book at www.sap-press.com/3745. The figures in the e-book are also full-color.

Clicking the binoculars icon brings up a window where you can go to the ELEMENTS tab and fill in a date in the To field. That means you want to select all materials that have elements older than said date. You can even pick the specific elements you want to investigate. As a result, you'll see the screen shown in Figure 7.16.

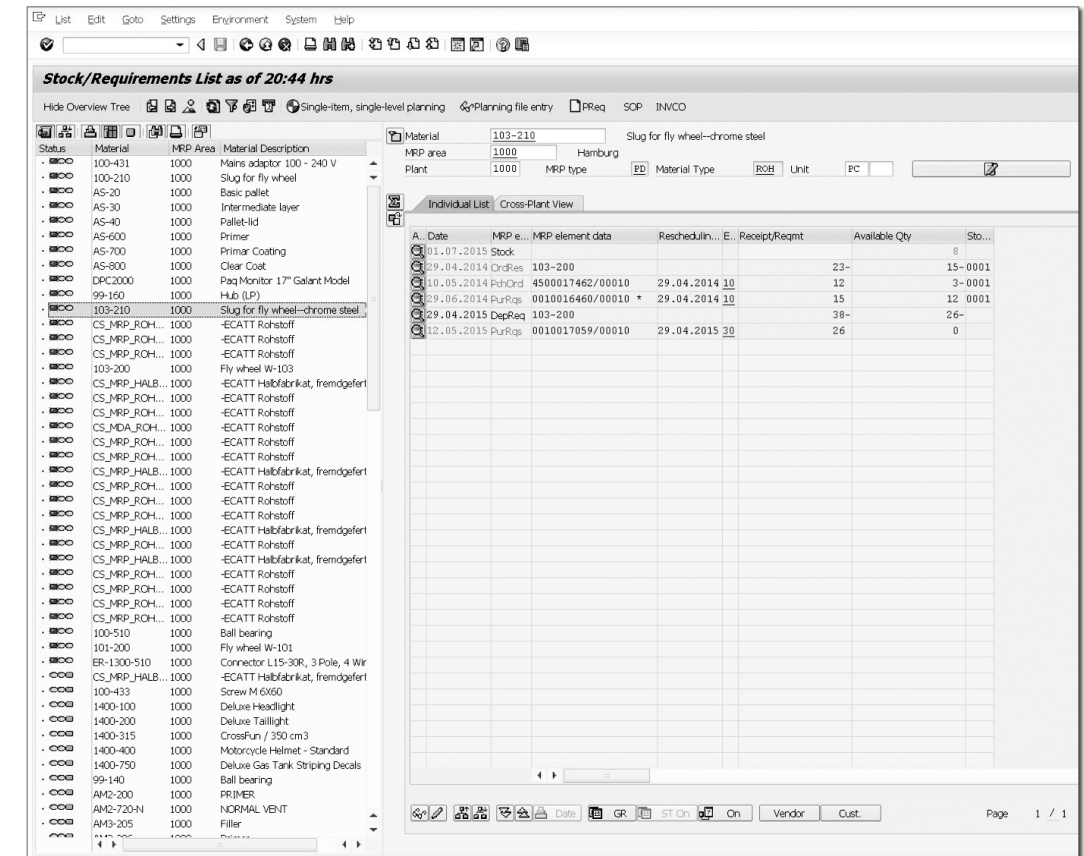


Figure 7.16 List of Materials with Outdated Elements and the Stock Requirements List for Details*

You can see a list of all the materials that have at least one of the outdated elements selected earlier. You can now go through the list and view the details. The outdated elements are now marked in blue within the STOCK/REQUIREMENTS LIST screen.

You can also use Transaction MD07 to see, at a glance, how you're doing with your safety stock planning. If you're working in an MTS environment, you should forecast your product's sales and cover any variability—the difference between forecasted and actual sales, the lack of adherence to planned lead times, and any interruptions—with a safety stock. We highly favor dynamic safety stock over the static safety stock in MRP 2. You can have the dynamic safety stock controlled by way of the coverage profile. That type of safety stock is expressed in days and therefore can be assigned to many products. It's also visible in Transaction

MD07, if you know how to set up and interpret the lights. A range of coverage profile then allows you to set a target safety stock level as well as a maximum stock level. If, for example, you set 5 days as the target and 20 days as the max for a group of products in your warehouse, you're telling the system that there should be enough inventory left over, after you cover your forecast, to get you through 5 days of average sales, if you sell more than what was predicted and forecasted. But the system also cuts the supply (if you have lot sizing EX) so that your inventory never exceeds more than 20 days to be held in stock. If you work with fixed lot sizes or minimum lot sizes, there might be the occasional excess stock (that's when you get an exception 25).

The system is now able to plan for these targets but, as we all know, there is variability, and not everything will turn out to be on par. But you can monitor these levels with Transaction MD07. When calling up your list for the product group for which you've maintained the 5-day target and 20-day max, you can set the traffic lights with a range for the following:

< red >> 5 days >> yellow >> 20 days >> green >

This way, you'll see a display where all the products that have less than 5 days of supply in inventory will be on top of the list with a red light. All the products that have inventory which lasts for at least 5 days and less than 15 days will be in yellow, and all the products with excess stock over 15 days will have a green light at the bottom of the list.

Using Transaction MD06 as Your Exception Monitor

Many people use Transaction MD07, and almost everybody uses Transaction MD04, but not many people use Transaction MD06 or Transaction MD05. You might wonder why you should use Transaction MD06 when the information is already outdated because Transaction MD06/Transaction MD05 is a snapshot in time, that is, a stock/requirements list as it was created at the time of the last planning run. It's called the MRP list because it has the time stamp of the last MRP run. When you use Transaction MD07, you'll get a list with all materials belonging to an MRP controller (or a product group) and their associated, dynamically created stock/requirements lists. This is a good thing if you're cleaning up outdated elements, but not if you want to get in the mode of an exception-minded business and want to tend to those things getting off plan only. Transaction MD06 is the transaction to use for that because you have the ability to limit the

list to a certain date (other than in Transaction MD07 where you're asked to provide a FROM and a TO date in the initial screen).

Because the planning run creates the MRP list as the last step of the planning sequence, the MRP list has a time stamp and is, or was, valid only at that specific time and date. By entering yesterday's date, you'll only get MRP lists that were created yesterday. Therefore, you get a list of all materials that were planned yesterday—and no others—which is a great thing because no one wants to work off a list that includes both materials you need to look at and materials you don't. Why look at materials that were not planned and therefore haven't received an MRP-relevant change since the last time you looked at it?

As in Figure 7.17, call up Transaction MD06 first thing in the morning with yesterday's date if the MRP run runs before midnight (and with today's date if MRP runs after midnight).

MRP List: Initial Screen

Individual access / Collective access

MRP Area

Plant 1000 Hamburg

Selection by

MRP controller 101 PP GENERAL

Product group

Vendor

Production line

Restrict Selection

Date	Exception Groups	Processing Indicator	Material Data
MRP date	From	24.06.2015	To 24.06.2015
Processing date	From	<input type="text"/>	To <input type="text"/>
Stock Days' Supply	From	<input type="text"/>	To <input type="text"/>
1st Receipt Days' Supply	From	<input type="text"/>	To <input type="text"/>
Second Receipt Days' Supply	From	<input type="text"/>	To <input type="text"/>

Figure 7.17 Initial Screen of Transaction MD06

The list that will come up is limited to only those materials planned by the MRP date on the date indicated. As shown in Figure 7.18, only nine materials were planned on 24.06.2015. And that is all you need to look at and worry about.

MRP List: Material List

Selected MRP Lists: Define Traffic Light Exception Groups

Plant: 1000 Hamburg
MRP Controller: 101 PP GENERAL

Light	Material	MRP Area	Material Description	CI	N	1	2	3	4	5	6	7	8	StokDS	1st RDS	2nd R	MRP date	Plant st...	Buh	Safety Stock	Reorder P...	MTyp	PT	SP	A.	MR...
🔴	COOPER-102-100	1000	Casing 102	✓										3,9	3,9	3,9	24.06.2015	6	PC	0	0	0	0	0	0	0000
🔴	COOPER-102-130	1000	Hexagon head screw M10	✓					1					999,9	6,0	6,0	24.06.2015	0	PC	100	100	0	0	0	0	0000
🔴	COOPER-102-200	1000	Hollow shaft	✓					1					4,0	4,0	4,0	24.06.2015	0	PC	0	0	0	0	0	0	0000
🔴	COOPER-102-400	1000	Pressure cover--sphere-cast	✓									1	3,9	3,9	3,9	24.06.2015	13	PC	0	0	0	0	0	0	0000
🔴	COOPER-102-500	1000	Bearing case	✓						11				0,5	0,5	0,5	24.06.2015	7	PC	0	0	0	0	0	0	0000
🔴	COOPER-102-600	1000	Support base	✓									1	3,9	3,9	3,9	24.06.2015	8	PC	0	0	0	0	0	0	0000
🔴	COOPER-102-700	1000	Sheet metal ST37	✓									1	3,9	3,9	3,9	24.06.2015	11,00	MZ	0,00	0,00	0	0	0	0	0000
🔴	COOPER-103-200	1000	Fly wheel W-103	✓									1	3,9	3,9	3,9	24.06.2015	11	PC	0	0	0	0	0	0	0031
🔴	COOPACP-103	1000	Two-Stage QT Pro Air Compressor	✓										999,9	999,9	999,9	24.06.2015	630	PC	138	0	0	0	0	0	0031

Figure 7.18 MRP Lists Generated on 24.06.2015*

It becomes apparent that if you work the right way with Transaction MD06, you'll move much closer to being an exception-minded business. In Figure 7.18, you can see that the initial screen of Transaction MD06 gives you many options to limit the list of materials you're looking at. You can prioritize, filter, and sort by exception message groups, processing indicator, or even master data fields. This will give you utmost control and the ability to build a preconfigured way of working through your exceptions first thing in the morning.

Get in the habit of calling up Transaction MD06 first thing when you get to your desk in the morning. Do this every day! Use the processing indicator to check off those items you looked at, and jot down thoughts and ideas in the notes section. After you do this awhile, the list becomes manageable and allows for quick and focused exception management.

Setting Up the Traffic Lights

The red, yellow, and green traffic lights in both Transaction MD06 and Transaction MD07 give you a quick indication in the list view about potential overstocking or understocking. A red light will come up if you have a demand in the past that is still unfulfilled. How far in the past this demand element lies is specified by the negative days of supply shown in a column in the list display. A green light, against common belief, doesn't mean everything is in order. It means that there is more stock than we need to fulfill requirements in the future. Green lights, there-

fore, can alert you of too much inventory held. Yellow lights are assigned to materials where demand and supply is in perfect balance.

SAP allows you to change the traffic light settings to tell the system when you want to be alerted with a red or green light and what range is acceptable to have an item with a balanced demand and supply. The standard setting for the traffic lights looks is shown in Figure 7.19.

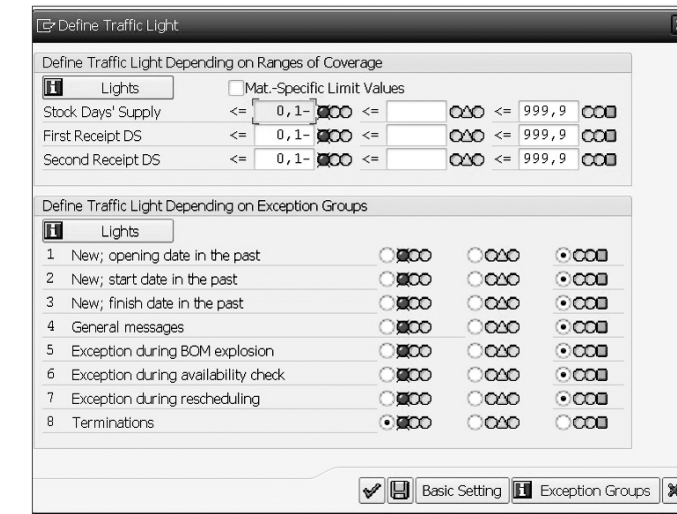


Figure 7.19 Traffic Light Setting*

Now, you can set up these traffic lights as you wish and build a list that works to your advantage and gives you the most information at a glance. For example, a certain client developed their own particularly useful traffic light system particularly useful. In this system, they set up the list so that it's sorted from most urgent materials handling down to long-term opportunities. Therefore, they set the monitor so that materials with stock days of supply below safety levels (and not only after they are overdue) have a red light. Anything that has receipts coming in to cover demand within an acceptable time frame gets a yellow light, and anything that has too many receipts coming too early—and therefore needs to be expedited out—gets a green light.

Even better is that those annoying situations where they have little inventory and no demand anytime in the future (you know, the ones with 999.9 days of supply) get no traffic light at all. So, in essence, they created a fourth light.

Notice in Figure 7.20 how they set the limits so that they sort materials according to their STOCK DAYS' SUPPLY (anything that has fewer than 2 days to cover demand gets a red light). Then every material that gets covered for 11 days of demand—with receipts or actual inventory—gets a yellow light, and everything that's covered up to 19 days is green. All materials that have coverage for more than 19 days, or no demand at all, will not get any light at all. Therefore, the last category isn't really urgent but poses an opportunity for inventory reduction.

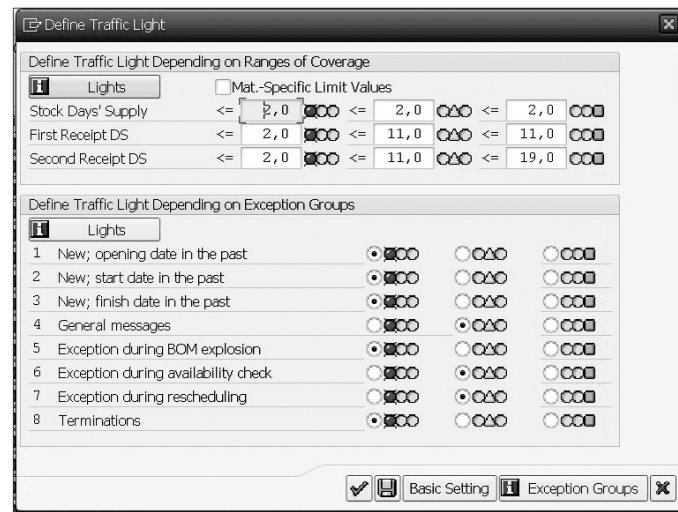


Figure 7.20 Customized Traffic Light Setting*

They also use the traffic lights for exception messages—so that the exception groups they consider more important are sorted above the ones that aren't so urgent combined with the ranges of cover (Figure 7.21).

Even though we prefer to work in the monitors without sorting and without checking off materials from the list, this provides a great solution for when you want to go through the list from top to bottom and check off the materials you consider “done.”

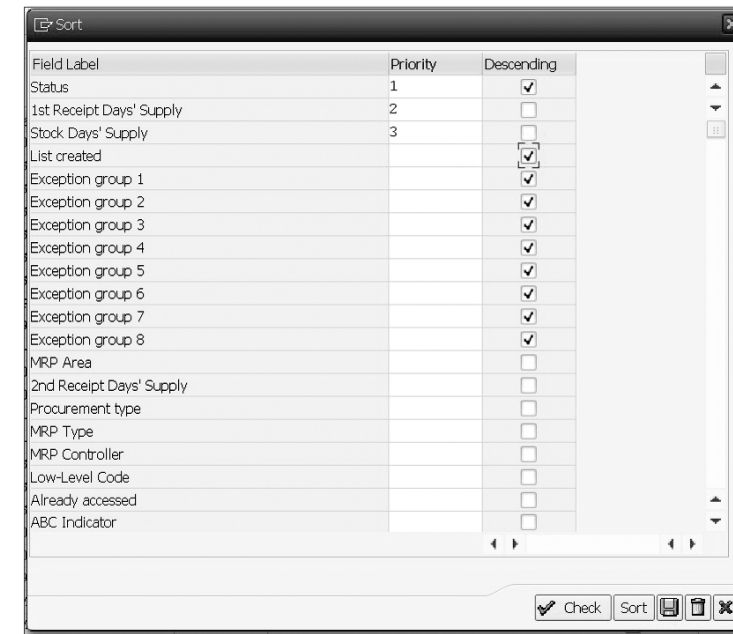


Figure 7.21 Sorting in the Monitor

7.2.4 Putting It All Together

Exception monitoring, the third pillar in our system of effective materials planning with SAP, can be a daunting, if not overwhelming task because of the sheer amount of materials, exceptions, and notifications a planner has to deal with on a daily basis. Often, the overwhelming majority of these messages are meaningless and generated out of erroneous basic data settings, outdated documents, and missing procedural control.

It's therefore essential to streamline and organize the materials planner's workload to deal with exceptional situations after planning is done and the real world sets in. Without a well-thought-out system of intelligent exception monitoring, the materials planner will always struggle to keep on top of the replenishment process, and it's nearly impossible to holistically optimize service and inventory levels.

What does such a system look like? For one, you must provide some time during the busy day to tend to exception monitoring. Monitoring exceptional situations

must happen every day. The best time of day to do this is most likely the first 20 to 30 minutes in the morning right at the beginning of your workday. In most organizations, the MRP run is doing its magic overnight, so the MRP lists are still current, and Transaction MD06 provides an excellent means to sort out and build your task list for the day to come.

Then, this system must provide a way to filter, sort, and prioritize the exception messages according to their urgency and importance. Note that if basic data is set up correctly, and the process is executed properly, there are no negligible messages. They all do mean something and have their own right to exist and alert you of an exception—a situation where the actual result strays from what was planned for. Still, there are exceptions that are less urgent and less involved than others, and the materials planner can't possibly look at every message for every material every day. SAP has already done a great job in assigning exception messages to standard groups. All expediting messages, for example, are allocated to group 7. You can easily use these exception groups for your prioritization and work the "late in finishing" messages first, then the "late in starting" messages second, and eventually expedite orders in the afternoon. Of course, you can define your own groups, but the standard provides a brilliant starting point for your sorting, filtering, and prioritization.

There are other tasks that need to be taken care of in the busy day of a tactical materials planner: converting order proposals into fixed receipts, expediting late or early deliveries, and avoiding stock-outs at all cost. But don't forget to leave some time at the end of the day to reduce superfluous inventory. The items with green lights in Transaction MD07 have too much inventory too early, and there are lots of opportunities to reduce your dead stock and overall inventory levels. The latter task mostly falls through the cracks as the planner is busy doing "more important" things such as firefighting. It's an absolute must that you organize your day ahead of time so that you get to perform all necessary tasks of a tactical materials planner and don't get bogged down with fabricated urgencies and seeming disasters.

Now, let's talk about an example of how you could start building such a system of intelligent exception monitoring. Figure 7.22 portrays a possible day in the life of a tactical materials planner. Obviously, this is a suggested approach to exception monitoring and other daily tasks that can be customized to your own needs. A lot more detail can be added to this poster, and we recommend standardizing the

procedures in this or a similar way for all planners across the plant or even throughout the company. By no means do we suggest limiting the materials planner's creativity in dealing with exceptional situations, but rather we provide a basic approach for reacting and curing exceptional situations when execution strays from the plan.

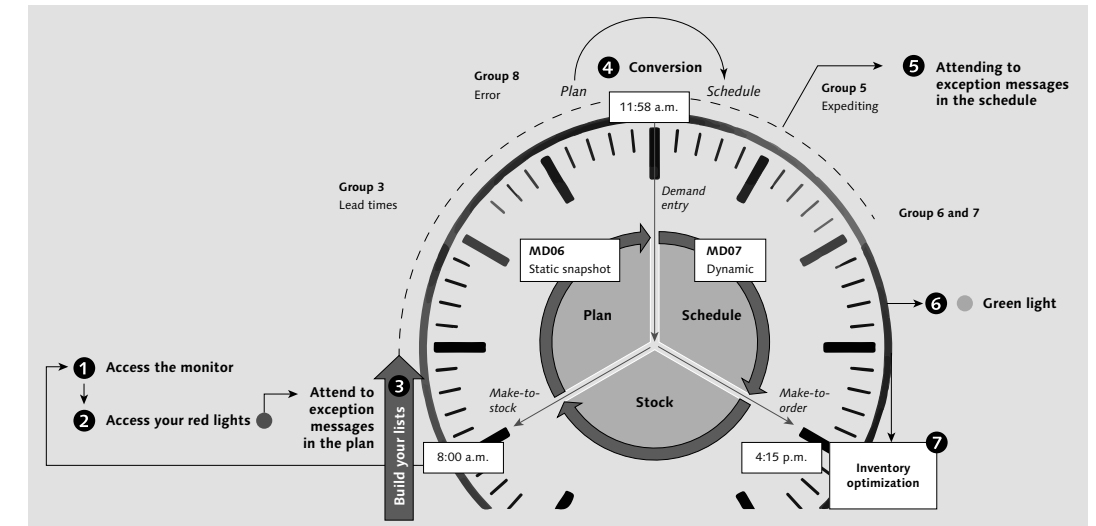


Figure 7.22 A System of Daily Exception Monitoring

In this example, the planner could get started in the morning with Transaction MD06 ① and tend to the red lights first ②. These are materials where we're getting awfully close to running out. Then we'll start prioritizing by exception messages, or better, exception groups ③. Group 3 contains exceptions dealing with late finishes. As stated previously, these are the most critical exceptions. Group 2 messages are next in line as these are late in starting—a conversion date was missed, or a purchase order was not send out. Then we'll look at all those materials where the planning run abruptly stopped because of some issues with the basic data. Do you have a material in the last run that was marked for deletion? Was there a status that called for different processing?

As the day moves on, our Transaction MD06 display becomes outdated, and it's time to toggle over to Transaction MD07 ④. After you switch, you'll be faced with a complete list of all the materials for your MRP controller key. Any red lights you see now are either leftovers from yesterday or something happened previously in

the morning that caused the red light to come on. Other than that, there should either be yellows or greens. As we mentioned before, the yellow lights are for materials where demand is in perfect balance with supply. However, there might be some materials for which you must turn an order proposal into a fixed receipt (purchase order or production order) today.

After that is all done, expediting comes to the forefront, and vendors are called ⑤. We can ask them if they can deliver earlier (exception message 10), later (exception message 15), or cancel the order (exception message 20) because the ordered quantity isn't needed anymore. Expediting is a task performed manually. Expediting messages are generated when the planning run is unable to adjust a fixed receipt or fixed order proposal, so it meets a changed demand. All the planning run can do is notify you of a suboptimal situation and ask you to do something about it manually—picking up the phone or going down to the production line to interfere.

Toward the end of the day, we hopefully find some time to deal with inventory-related exceptions (dipping into safety stock [96] or excess inventory above a maximum range of coverage [25]) and green lights (too much stock too early) ⑥. This is something that often gets forgotten, and most planning systems are more concerned with avoiding stock-outs than reducing superfluous inventory on a regular basis. Yes, there is the occasional inventory-reduction program, but only rarely do we see steps and procedures in place to continuously optimize inventory levels ⑦ and diligently monitoring upper control limits for inventory holdings.

The day in the life of a tactical materials planner as shown here may or may not work in your organization. It doesn't matter. What matters is that you have some system that your planners can get started with and eventually improve. Without any guidance or understanding of the various elements and piecing it together, the materials planner will develop his own system to get by—with varying degrees of success. Within such an organization that is in survival mode, there is no accountability or standardization. Success is hard to measure because you have nothing to measure against.

To have an effective system, you must ceaselessly avoid red lights, relentlessly reduce exception messages, and continuously scrutinize green lights. After you make it a habit, it will become easy, and you'll open up an enormous amount of free time to tend to analytics and strategies (policies). Besides, being in control

and managing variability is much more fun than “transacting” all over the place, not knowing what's causing you trouble and being unable to make a difference.

7.3 Using the SAP Add-On Tool MRP Exception Monitor

The Exception Monitor is an SAP add-on tool and therefore not available in the standard SAP ERP. But it's an SAP transaction that was developed within the SAP namespace, by SAP Consulting in Germany, and it can be used without interfaces or data migration. In fact, it's a collection of standard transactions and reports so that you can manage exceptions in one place. The MRP Exception Monitor is a report with which you can not only view exceptions but also take action, all conveniently available in one place. Its primary purpose is to provide you with an all-encompassing cockpit to attend to the following situations:

- ▶ Critical sales orders (not yet confirmed, late)
- ▶ Critical production orders (missing parts, backlog)
- ▶ Erroneous goods movements
- ▶ Critical purchase orders (delayed, excess quantities, current backlog, future backlog, push in, push out)
- ▶ Undercoverage or overcoverage
- ▶ Missing parts

The MRP Exception Monitor provides an overview of exceptions in operational MRP and displays relevant MRP data. These include general error messages from the stock-/requirements list, for example, based on master data checks (material master, info records, etc.), or due to overcoverage, undercoverage, or delays. Therefore, it provides a very detailed extension to our system of exception monitoring with, primarily but not limited to, Transaction MD06. With the MRP Exception Monitor, you'll get an overview to all the movement data and its current state. Movement data that has critical planning status (such as delayed sales orders or production orders with missing parts) are aggregated and displayed with the possibility to drill down into further detail. MRP controllers therefore have an excellent overview of any errors, warnings, or notifications in their stock, requirements, and supply elements.

The following screenshots show the reporting functionalities in the MRP Exception Monitor, so you can see how this tool may be integrated into your system of intelligent exception monitoring.

First, in the SELECTION SCREEN, you can limit the display of exceptional situations to your specific choice and situation (see Figure 7.23).

Figure 7.23 MRP Exception Monitor – Selection Analysis Range

Of course, you can limit the range of materials you want to display exceptions for. Figure 7.24 shows the inclusions and exclusions you have at your disposal. Note that you can select by classification and therefore limit the display, for example, to AXE materials only.

Figure 7.24 MRP Exception Monitor – Selection Rules

Furthermore, you can select by rule as shown in Figure 7.25. Define what types of stock you want to take into focus, and select what MRP elements from the stock/requirements situation you want to consider and how these are to be displayed in the result screen.

A very useful function is the ability to select only those documents you deem critical for the specific situation you want to analyze. This way, you can focus on sales or display supply elements and its exceptions only. The results screen therefore can be customized to the specific role a planner wants to take on. For instance, if you check the DELAYED PURCHASE ORDERS checkbox, then all purchase orders (in the time range you've defined in the selection rule) from a delivery date in the past in Transaction MD04 are analyzed.



Figure 7.25 MRP Exception Monitor Selection of Critical Documents

As shown in Figure 7.26, you can also select by exception groups. This feature is also available in Transaction MD06 and provides the basis for prioritized exception monitoring. In addition to the Transaction MD06 selection, you might further prioritize your display (the way exceptions are sorted) with the assignments of exceptions to another grouping by DELAYS, OVERCOVERAGE, UNDERCOVERAGE, MASTER DATA, MISSING PARTS, OTHERS, and CHANGED PURCHASE PROPOSALS.

In the DAYS' SUPPLY tab (Figure 7.27), you define the traffic light settings for the material view, determine the intervals for the coverage/replenishment time matrix in the coverage view, and specify the days' supply limits for purchase orders with long days' supply.

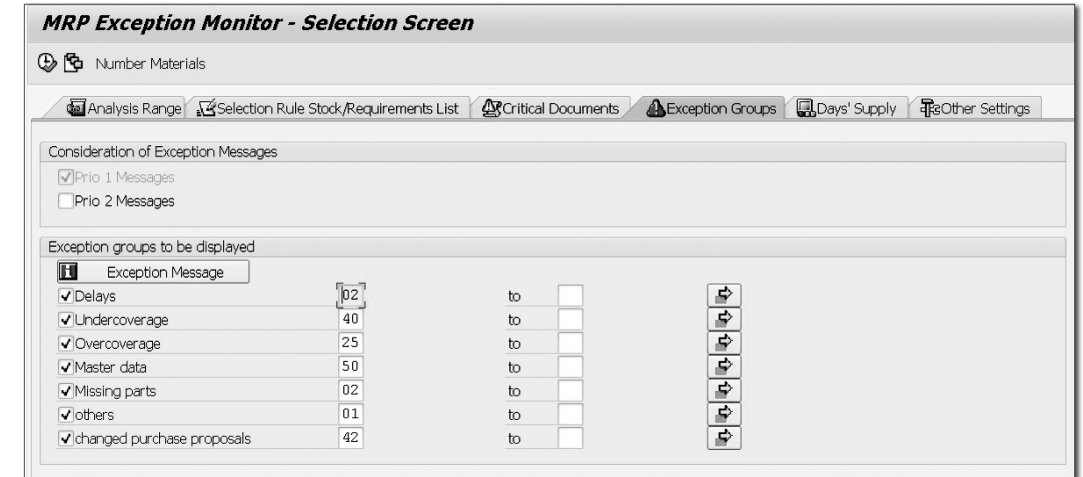


Figure 7.26 MRP Exception Monitor – Selection by Exception Group

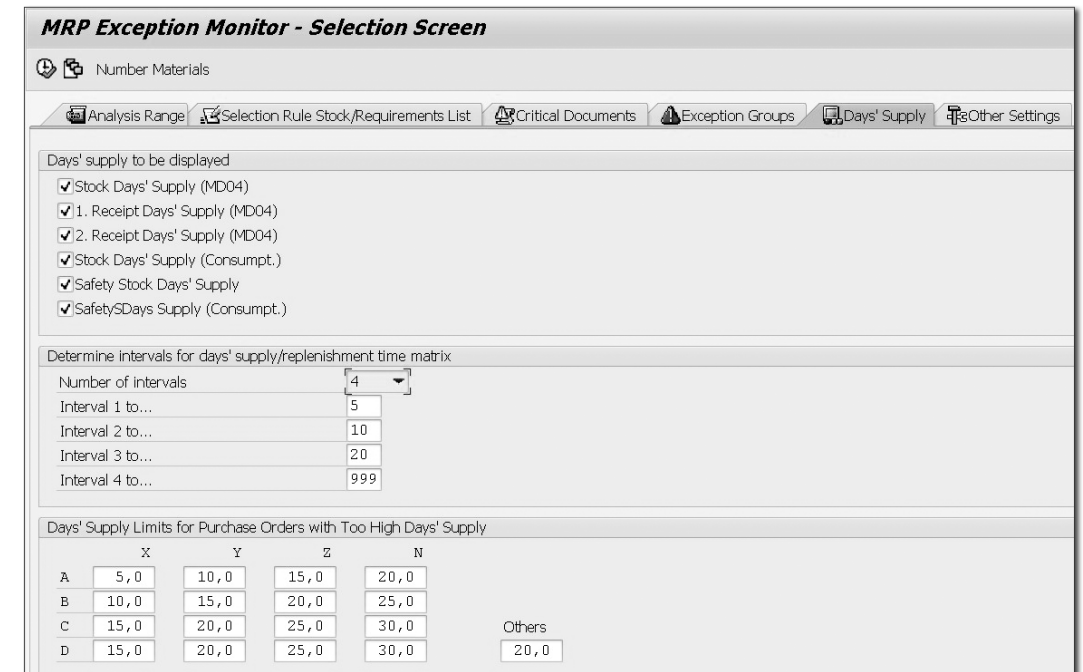


Figure 7.27 MRP Exception Monitor – Selection Days' Supply

Using the color settings of the MATERIAL VIEW, fields of the relevant columns of the MATERIAL VIEW can be colored as required. This increases visibility because in Transaction MD06, not all exception or critical status are available for all materials.

Besides color settings, the intervals of the replenishment time/coverage matrix can be shown. The specified intervals apply for both replenishment-time-axis and coverage-axis of the matrix and have a direct impact on the result in the matrix. When defining intervals, the bounds in which the relevant materials are compared are also determined.

After all selections are made, the result screens are displayed, as shown in Figure 7.28.

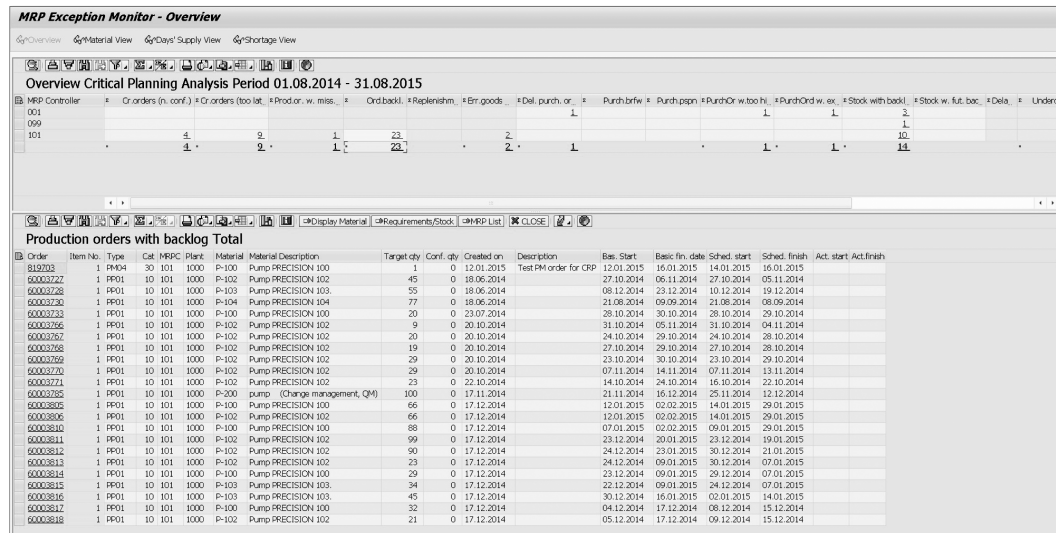


Figure 7.28 MRP Exception Monitor – Overview Screen

In the OVERVIEW screen of the MRP Exception Monitor, you can select specific messages, and the associated materials will come up in a list on the lower part of the screen. For example, we selected 23 messages in the ORDBACKL (order backlogs) column, and the related materials details are listed accordingly.

To navigate to the material view of the MRP Exception Monitor, select an MRP controller number and click MATERIAL VIEW. The Material View (Figure 7.29) allows all the materials of an MRP controller to be displayed with the relevant

planning status. In addition to standard information for the material, the relevant MRP exceptions and movement data errors are also listed. Differentiated and configurable coverage and demand information indicates the past and future stock situation.

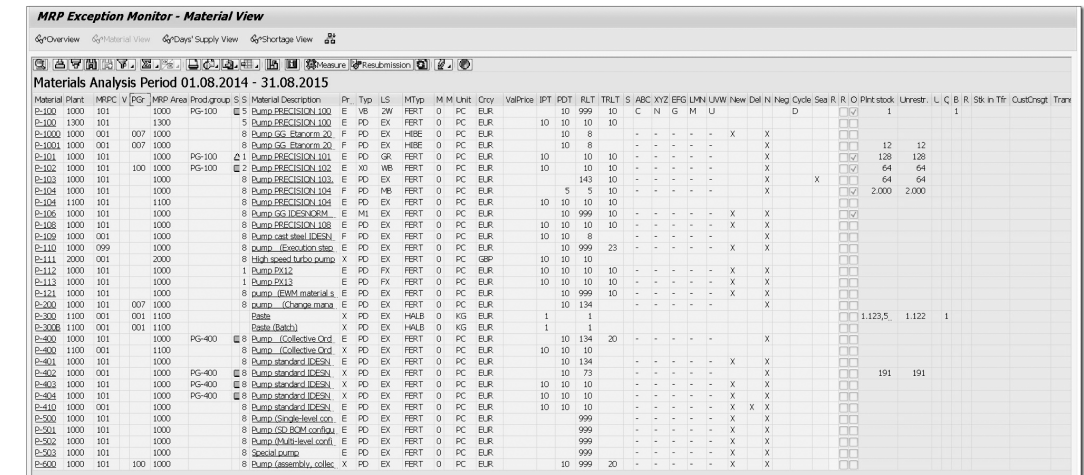


Figure 7.29 MRP Exception Monitor – Material View (Part 1)

In Figure 7.30, you can see more information in the MATERIAL VIEW by scrolling to the right.

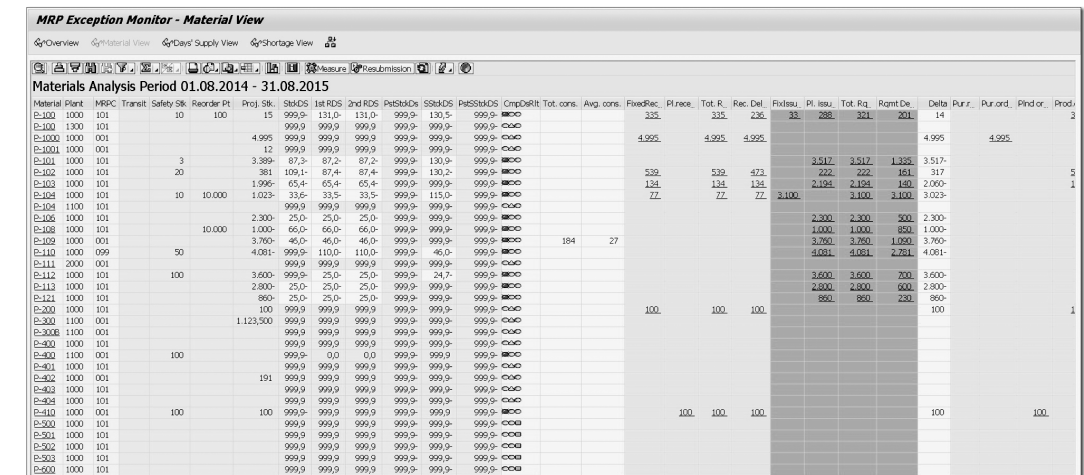


Figure 7.30 MRP Exception Monitor – Material View (Part 2)

Aside from many other views for various analytics, the MRP Exception Monitor also provides an overview to missing parts or shortage situations as depicted in Figure 7.31.

Meter	Plant	MRPC	Vendor	Plant	MRP Area	Prod group	Material Description	Receipts date	EI	MRP No.	E	Reqmt Qty	ShgtQty	Receipts date	EI	MRP No.	E	Qty rec.	P/Vendor	Name 1	Pint stock	Unit	Telephone1	Delivery Date	
E-104	1000	101			1000		Pump PRECISION 104	17.12.2014	VC	0000014385	100	800	433-								2.000	PC			
E-112	1000	101			1000		Pump PK13	02.01.2015	PP			300	300-												
E-106	1000	101			1000		Pump GG IDESH-NORM 100-106	02.01.2015	PP			200	200-												
E-108	1000	001			1000		Pump cast steel IDESH-NORM 170-230	01.12.2014	PP			200	200-												
E-121	1000	101			1000		pump (EWM material supplying)	02.01.2015	PP			200	200-												
E-108	1000	101			1000		Pump PRECISION 108	03.11.2014	PP			100	100-												
E-112	1000	101			1000		Pump PK12	07.02.2015	SH			100	100-												
E-110	1000	099			1000		pump (Execution steps)	07.02.2015	SH			50	50-												
E-103	1000	101			1000	RESTPG	Pump PRECISION 103	03.11.2014	PP			30	26-	23.12.2014	FE	000060003728	1	55			64	PC		23.12.2014	
E-101	1000	101			1000	RESTPG	Pump PRECISION 101	01.10.2014	PP			40	20-									128	PC		
E-100	1000	101			1000	PG-100	Pump PRECISION 100	07.02.2015	SH			10	9-	30.10.2014	FE	000060003733	1	20			1	PC		30.10.2014	
E-102	1000	101			100	PG-100	Pump PRECISION 102	01.09.2014	PP			20	1-	24.10.2014	FE	000060003771	1	23			64	PC		24.10.2014	

Figure 7.31 MRP Exception Monitor – Missing Parts View

The shortage, or missing parts view, lists materials that have a shortfall within a specified time period. To get to this view, select an MRP controller, and click SHORTAGE VIEW.

Detail views can also be displayed for all materials and movement data, which list the elements of the aggregated views. There are also further options for navigating to the standard transactions, Transaction MD04 and the like, of the respective data objects.

The MRP Exception Monitor represents an excellent extension and addition to round out your system of intelligent exception monitoring. With the MRP Exception Monitor, the materials planner is empowered to manage exceptional situations and close the gap between planned and actual results.

7.4 Summary

Exception monitoring represents the third pillar in our system of effective materials planning. As you set effective policy, your exceptions become more meaningful and significant. Now it's up to the planner to deal with these exceptional situations. We can't ignore any of the exceptions anymore. They all need to be analyzed and cured, and it becomes more important than ever that we wisely sort, filter, and prioritize the way we look at them.

You can build your own system of regular exception monitoring. There is an abundance of tools, features, and riggings that can be used in standard SAP to

round out an organism of, not only monitoring, but also curing exception messages. Managing and dealing with exceptions is important, especially if you want to move your organization to a more exception-minded business. In an exception-minded business, the rule and principles stay (the strategy is adhered to and survives) while the exceptions breaking the rules are analyzed and cured to improve the rule or strategy. That is a very important aspect of an effective system of materials planning.

If you find that there isn't enough automatism in the SAP ERP approach to exception monitoring, take a more thorough look into what the MRP Exception Monitor provides.

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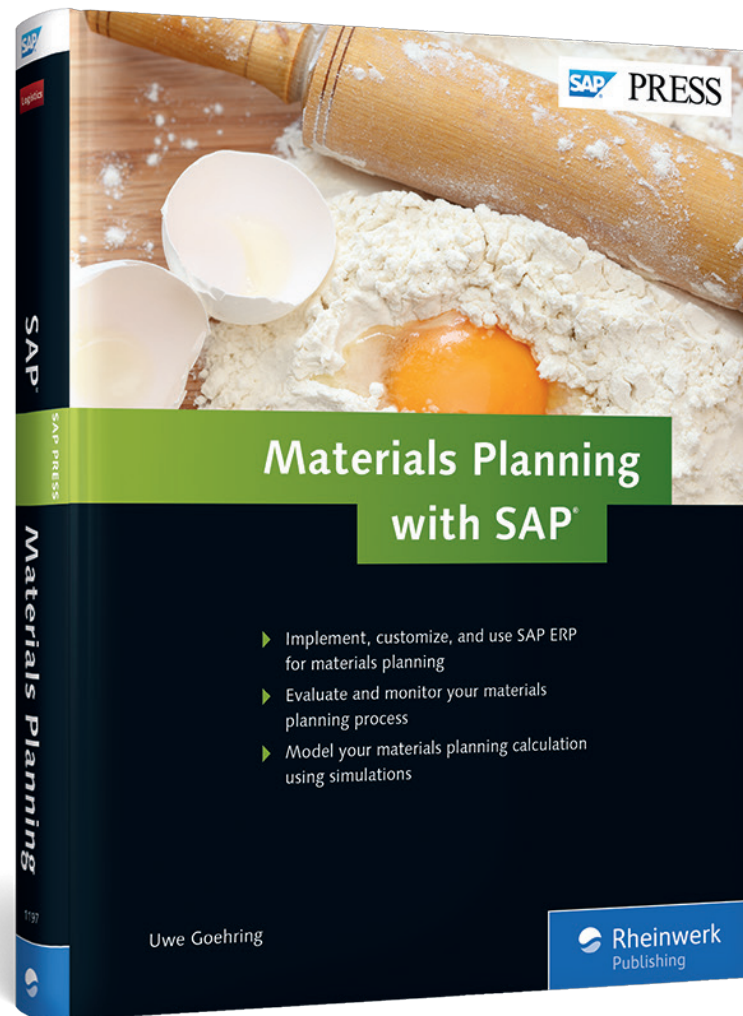
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