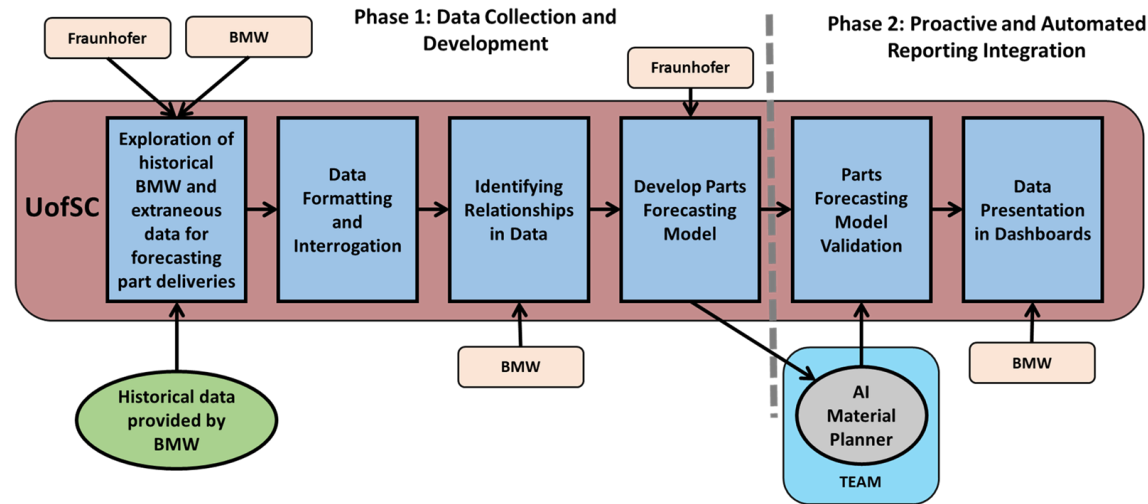


Agenda

1. **Announcements / Action Items**
2. **UofSC Update**
3. **Fraunhofer Update**
4. **Brainstorm on Objectives**

UofSC Team - Status Update for 10/11/2021

UofSC Roadmap



Progress Made Last Week

- Review zgve, 130, MD04 data
- Continued development on part ranking algorithm
- Dashboard refinement
- Team met to brainstorm objectives and how to address items such as inconsistencies, exceptions, KPIs, best practices
- Review interviews
- Completed Task 1 Deliverable

Current Task: Data Formatting and Interrogation

- Identify underperforming suppliers/parts (*in progress*)
- Calculate optimal thresholds
- Identify main objective for model
- Identify relationships in performance with data (*in progress*)
- Research outside sources (*in progress*)
- Preliminary development of model for parts-forecasting
- Integrate formatted data and findings into model
- Analysis for dashboard integration
- Deliverable document

Deliverable: Key capabilities for part-forecasting model and prepared data for model creation

Plans for this week

- Continuing to review data
- Continue Refining data dictionary and database
- Brainstorm on key objectives and identify how to address

Dashboard



Program Name

Version

Search part number, name, or other parameter




Material ID \$number



Health Status \$number

ID	Part Number	Supplier	Prognostic Status	Notation
Foot	1234567890	Ipsum	Health Status	Notation
Zebra	1234567890	Ipsum	Health Status	Notation
Yak	1234567890	Ipsum	Health Status	Notation
Drive	1234567890	Ipsum	Health Status	Notation
Elk	1234567890	Ipsum	Health Status	Notation
Vive	1234567890	Ipsum	Health Status	Notation
Cook	1234567890	Ipsum	Health Status	Notation
Test	1234567890	Ipsum	Health Status	Notation
Lime	1234567890	Ipsum	Health Status	Notation
Just	1234567890	Ipsum	Health Status	Notation

Part Detailed Information

Material ID: \$number

Health Status: \$number

Stock DoS: \$number days

First Receipt DoS: \$number days

Exceptions: \$number

Comments:

\$date \$time [\$username] \$string

\$date \$time [\$username] \$string

Part Exception Manager

\$number Material ID

\$number Current Exceptions

Heading	Heading	Heading	Heading

Exception Manager

\$number Current Exceptions

Search Exceptions

ID	Part Number	Supplier	Severity
Test			

Pause

What if?

Add Comment

AI Suggest



MPA Weekly Update 10/11 - Fraunhofer

Summary of last week:

- Interviews with material planners continued – received different perspectives
- Continued evaluation of potential expert-system framework solutions
- Experimenting with potential expert-system frameworks
- Jeno got access to Impact

Plans for this week:

- Evaluating potential expert-system framework solutions for the recommendation engine
- Document the information obtained on the interviews
- Need access to Impact for other team members and orientation on where the relevant data is located in Impact

Concerns/Comments:

- None

Broad Objective

How can we reduce material Planner efforts?

Potential Solutions

- The user dashboard can integrate all needed data and analysis into **one location** for the planner.
- Provide Key Performance Indicator (KPIs) on dashboard that could guide material planner to reduce their daily efforts.
- Recommend best practices for the material planner.
- “What-if Analysis” The dashboard can allow material planner for creating “what if” scenarios based on alternative suppliers, transportation, stock, etc.
- ?
- ?

1 Dashboard

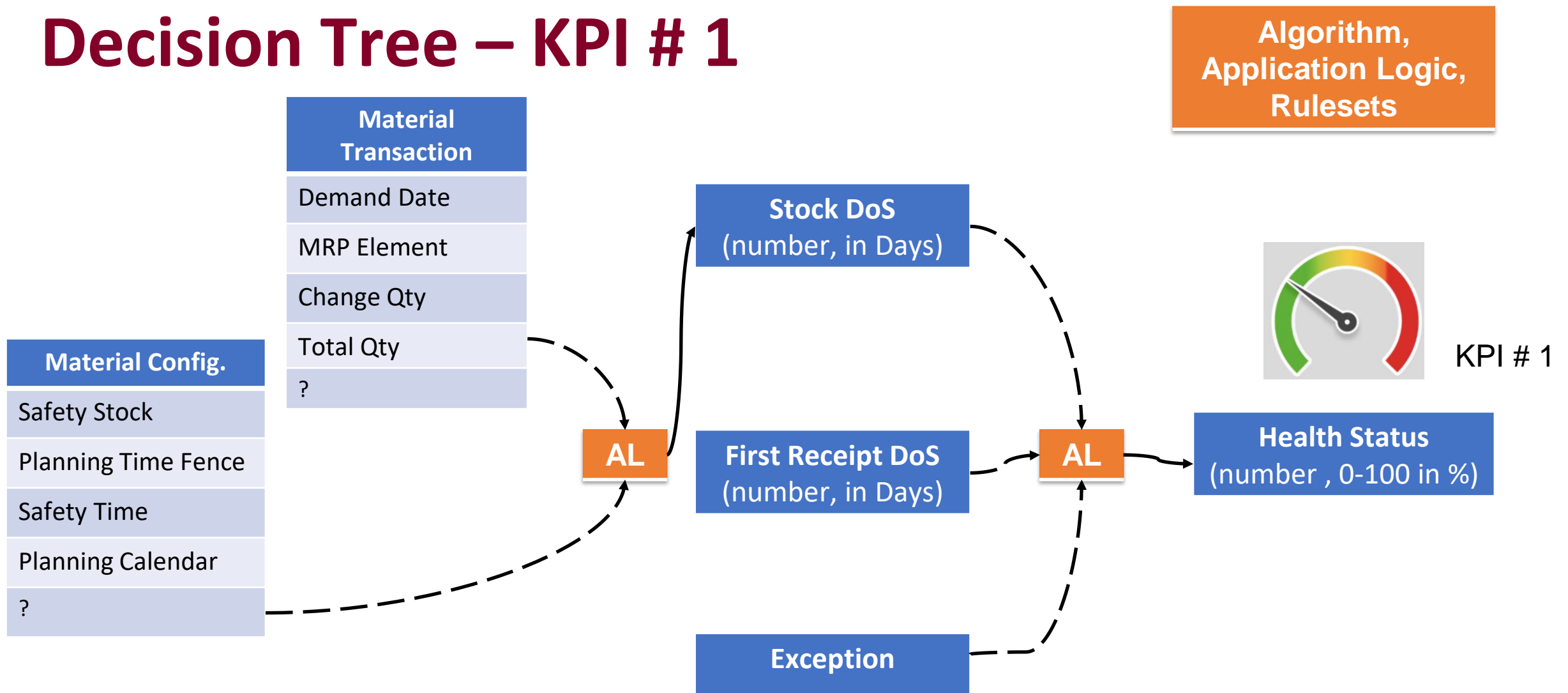
- Provide Key Performance Indicator (KPIs) on dashboard that could guide material planner to reduce their daily efforts.
- KPIs
 - Health Status (KPI # 1)
 - Part Ranking (KPI # 2)

Questions to be investigated:

- What are the KPIs for the material planner to reduce their daily efforts?*
- What are fields/columns in datasets to generate these KPIs?*
- What can be an Application logic/Algorithm to derive these KPIs?
- What are use case scenarios/test cases scenarios to validate the results?

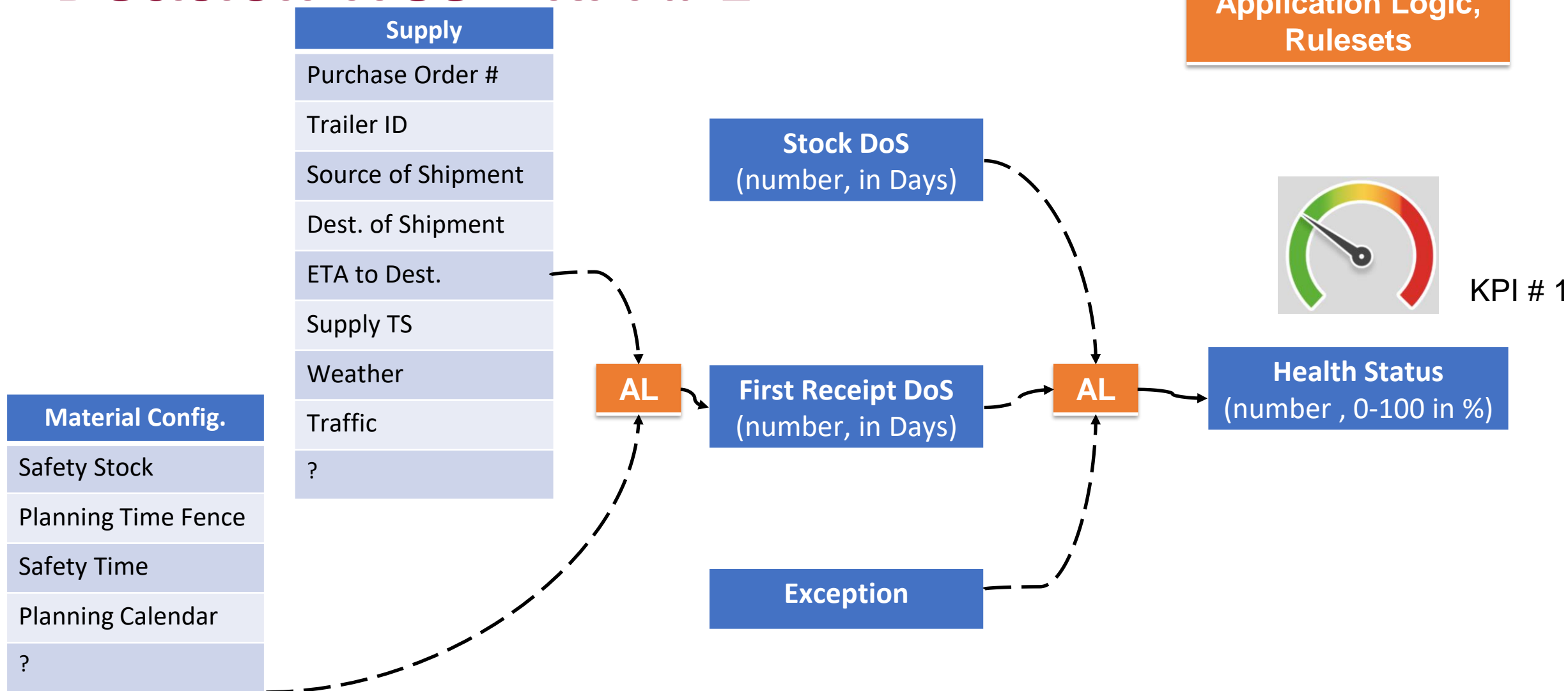
*We have partial answer

Decision Tree – KPI # 1



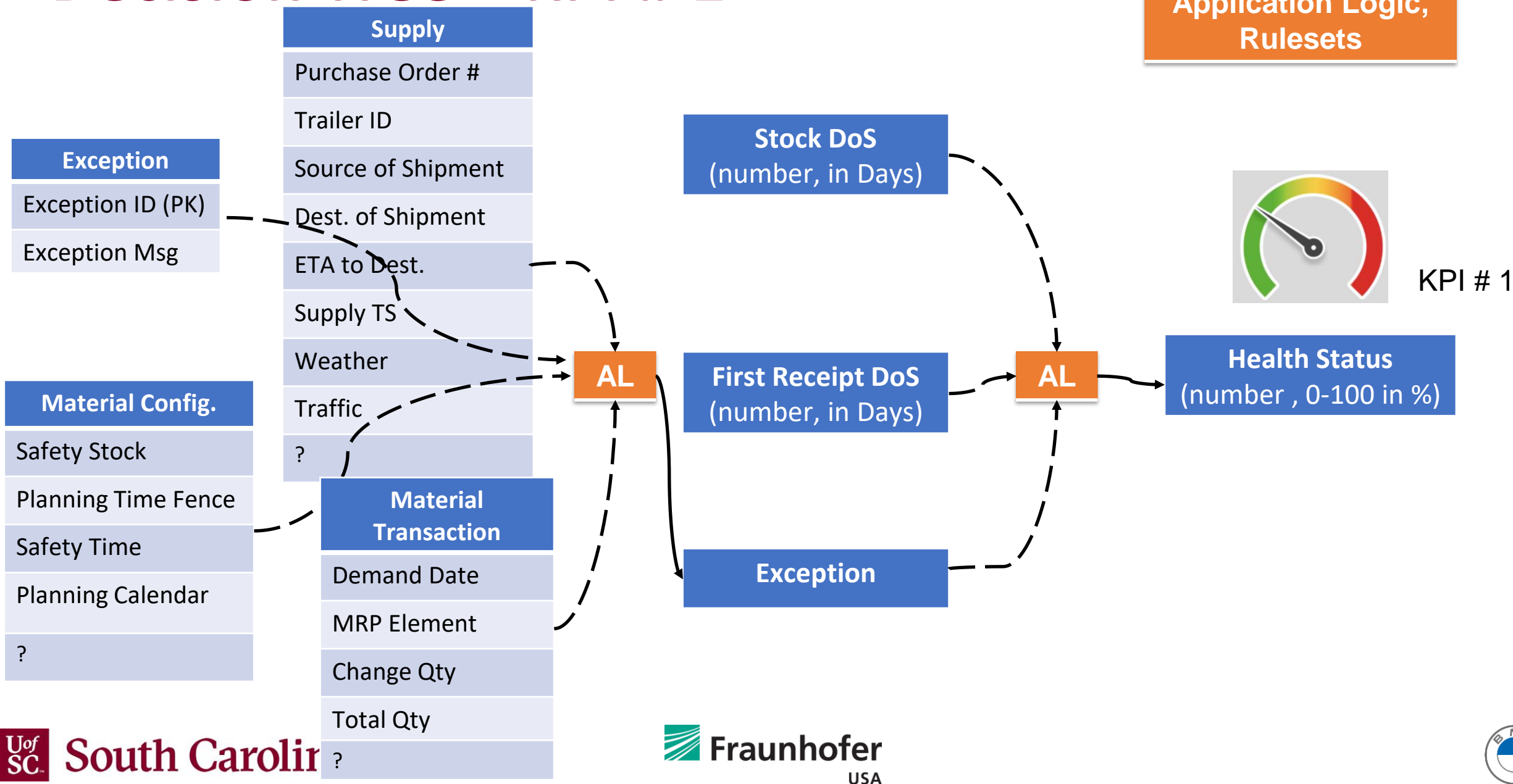
Decision Tree – KPI # 1

Algorithm,
Application Logic,
Rulesets

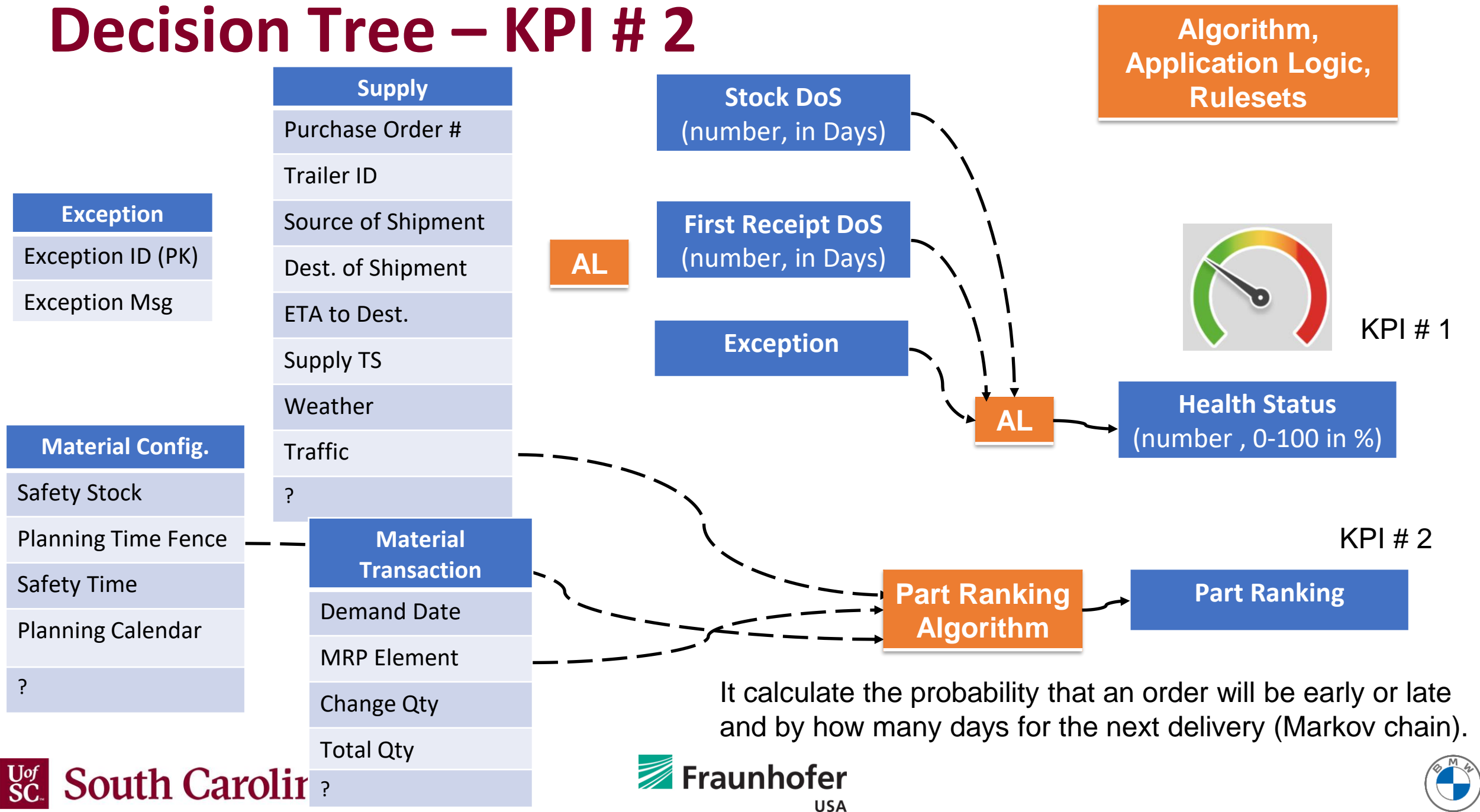


Decision Tree – KPI # 1

Algorithm,
Application Logic,
Rulesets



Decision Tree – KPI # 2

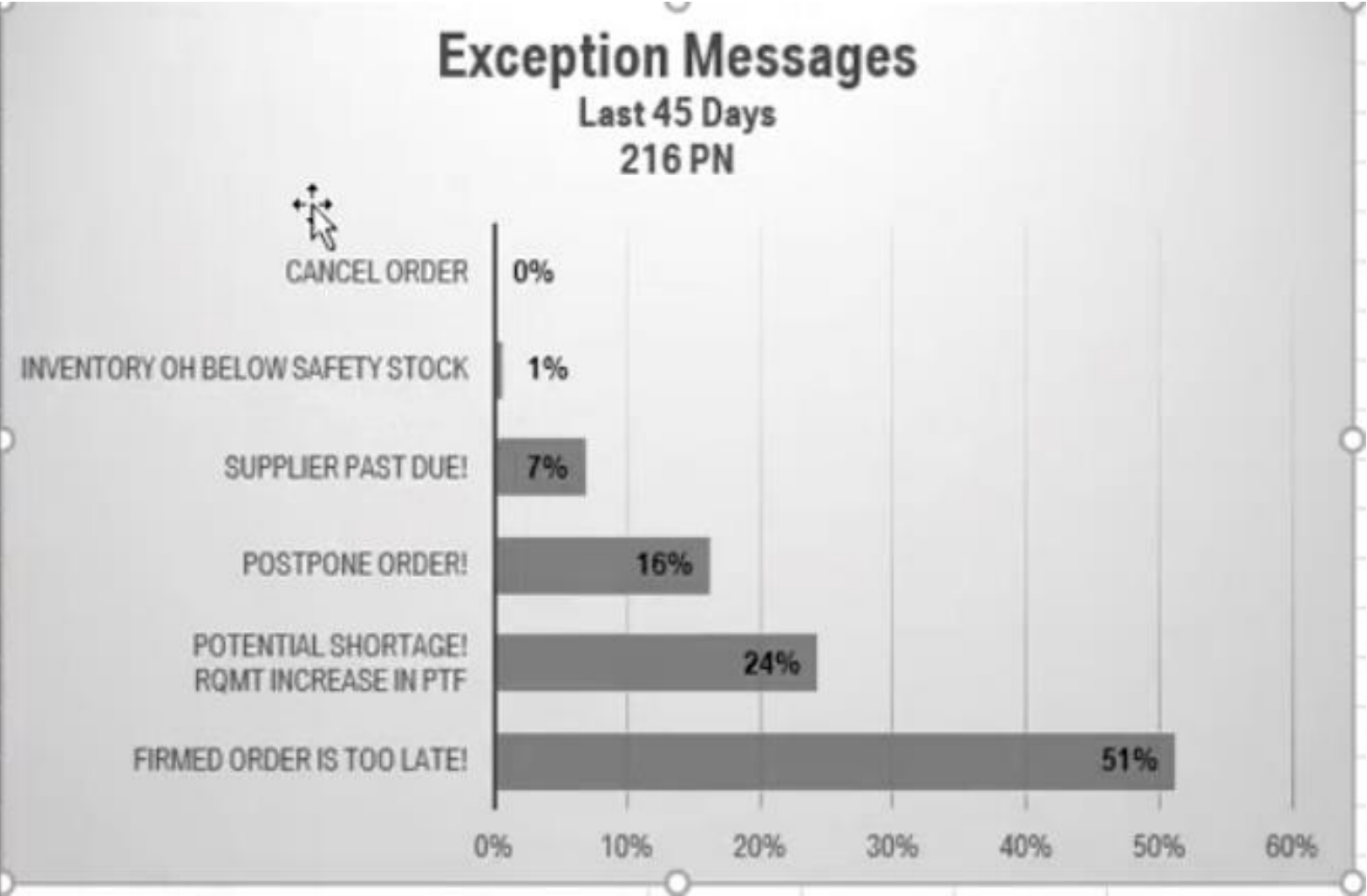


#2 Best practices for material planner.

- Recommend best practices for the material planner
 - Material Planner spends a significant amount of his/her daily time in reviewing exception messages.
 - Improve quality of decisions made by reducing overall number of exceptions
- Questions to be investigated
 - What are the most frequent exception messages generated?*
 - What are the root causes of some of the highly generated exception messages? *
 - How could we reduce/avoid the generated exception messages in order to reduce the material planner effort?*
 - How can we validate that the recommended best practices are effective?

*We have partial answer

#2 Best Practice



ID	Exception Message
10	Firmed order is too late
30	Potential shortage! Rqmt increase in PTF
15	Postpone order!
4	New order, Supplier past due!
96	Inventory on hand is below safety stock

(Image credit : Joshua)

Rule book

Credit: FhG team - Rulebook

Exception	Message	Scenarios	Desc.	Whe n	Recommendation /Purpose
Exception 96	Inventory on hand is below safety stock	Ignore_Inventory_On_Hand_Is_Below_Safety_Stock			
Exception 7	Supplier past due	Supplier_Past_Due			
Exception 15	Postpone Order	Ignore_Exception, Zero_Out_Exception_15			
Exception 30	Potential shortage, requirement increase in PTF	Ignore_Potential_Shortage, Pull_In_Shortage_Quantity, Expedite_Shortage_Quantity			
Exception 10	Firmed order is too late.	Ignore_Exception_10, Expedite_Order_for_Exception_10			

Material Config.

Safety Stock

Planning Time Fence

Safety Time

Planning Calendar

?

Material Transaction

Demand Date

MRP Element

Change Qty

Total Qty

?

Supply

Purchase Order #

Trailer ID

Source of Shipment

Dest. of Shipment

ETA to Dest.

Supply TS

Weather

Traffic

?

#3 What-if Analysis



Program Name
Version

Username

Search part number, name, or other parameter

Settings

Navigation

Part: #
"Drive"



Prognostic Health Status

ID	Part Number	Supplier	Prognostic Status	Notation
Foot	1234567890	Ipsum	Health Status	Notation
Zebra	1234567890	Ipsum	Health Status	Notation
Yak	1234567890	Ipsum	Health Status	Notation
Drive	1234567890	Ipsum	Health Status	Notation
Elk	1234567890	Ipsum	Health Status	Notation
Vive	1234567890	Ipsum	Health Status	Notation
Cook	1234567890	Ipsum	Health Status	Notation
Hood	1234567890	Ipsum	Health Status	Notation
Lime	1234567890	Ipsum	Health Status	Notation
Just	1234567890	Ipsum	Health Status	Notation

What if

Material Planner Suggestions

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Quis ipsum suspendisse ultrices gravida. Risus commodo viverra maecenas accumsan lacus vel facilisis. Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Quis ipsum suspendisse ultrices

What if

Material Planner Response

Do you agree with the Material Planner's assessment and would you like to make its recommended change?

Reject Agree

What if

Material Planner Reasoning

Submit

What if

Part Editor

Selected PART

Alt Supplier 1
Alt Supplier 2
Alt Supplier 3
Alt Supplier 4
Alt Supplier 5
Alt Supplier 6

Alt Transport 1
Alt Transport 2
Alt Transport 3
Alt Transport 4
Alt Transport 5
Alt Transport 6

Alt Option 1
Alt Option 2
Alt Option 3
Alt Option 4
Alt Option 5
Alt Option 6

Supply Stock: 91
Expedite Cost: 102



Updated Health: 96%
17% Increase



Current Health : 79%

Commit

Feedback from Material Planner

The material planner suggestion will be displayed along with a box to collect the Planner's feedback on why they accepted or rejected

What-if Analysis

The dashboard will also allow for creating "what if" scenarios based on alternative suppliers, transportation, stock, etc.

Summary...

- How can we reduce material Planner daily efforts?
- Dashboard
 - KPIs, Data analysis on one dashboard to reduce material planners' effort
- Recommend best practice
 - Reduce Exception messages to reduce material planners' efforts
- What-if analysis
 - “what if” analysis for material planner (based on alternative suppliers, transportation, stock, etc.) to test and optimize different scenarios.

Back up

Exception 96 – Inventory on hand is below safety stock (Scenario – 1 - Ignore_Inventory_On_Hand_Is_Below_Safety_Stock)

In a new revision of the part (new AI level), a new part may deliver earlier than is planned, and **the new revision level copies the settings of the current part**. It forces the scheduled agreement to deliver a little bit earlier. Or **when you run out of parts**.

When: The first schedule agreement time is one to two weeks before the demand.

Recommendation: This is a new revision level part, ensure the first delivery timing is agreed with the supplier.

Stock/Requirements List as of 09:38 hrs

Material: 7469995-08 ASSY LH TOP BELT RR. EXT. ECE CANIBERRA

MRP area: MC10 Plant: MC10 MRP type: P1 Material Type: 1102 Unit: EA

A. Date	MRP ...	MRP element data	Reschedule	Exception	Receipt/Reqmt	Available Qty	St...
08/31/2021	Stock					0	
08/31/2021	Safety Stock	Safety Stock			6--	6--	
09/07/2021	SchAgr	F3MS00T /00001 *	08/31/2021 10		6	0	
09/10/2021	End of Planning Tim.						
10/12/2021	SchAgr	F3MS00T /00001			18	18	
10/15/2021	SchAgr	F3MS00T /00001			24	42	
10/18/2021	IndReq	01 /MITE*			2--	40	
10/19/2021	SchAgr	F3MS00T /00001			30	70	
10/19/2021	IndReq	01 /MITE*			11--	59	
10/20/2021	IndReq	01 /MITE*			9--	50	
10/21/2021	IndReq	01 /MITE*			10--	40	
10/22/2021	SchAgr	F3MS00T /00001			30	70	
10/22/2021	IndReq	01 /MITE*			8--	62	
10/23/2021	IndReq	01 /MITE*			5--	57	
10/25/2021	IndReq	01 /MITE*			11--	46	
10/26/2021	SchAgr	F3MS00T /00001			18	64	
10/26/2021	IndReq	01 /MITE*			13--	51	
10/27/2021	IndReq	01 /MITE*			9--	42	
10/28/2021	IndReq	01 /MITE*			12--	30	
10/29/2021	SchAgr	F3MS00T /00001			24	54	
10/29/2021	IndReq	01 /MITE*			10--	44	
10/30/2021	IndReq	01 /MITE*			8--	36	
11/01/2021	IndReq	01 /MITE*			7--	29	
11/02/2021	SchAgr	F3MS00T /00001			18	47	
11/02/2021	IndReq	01 /MITE*			5--	42	
11/03/2021	IndReq	01 /MITE*			5--	37	
11/04/2021	IndReq	01 /MITE*			10--	27	
11/05/2021	SchAgr	F3MS00T /00001			24	51	
11/05/2021	IndReq	01 /MITE*			8--	43	
11/06/2021	IndReq	01 /MITE*			3--	40	

Material Config.

Safety Stock

Planning Time Fence

Safety Time

Planning Calendar

?

Material Transaction

Demand Date

MRP Element

Change Qty

Total Qty

?

Credit: FhG team - Rulebook



Exception 96 – Inventory on hand is below safety stock (Scenario – 2 - Expedite_Inventory_On_Hand_Is_Below_Safety_Stock)

Inventory on hand is below safety stock. When you run out of parts.

When: The available quantity for today is less than the demand for today.

Recommendation: Urgent expedite order is required. Expedite order quantity should cover production for today and tomorrow.

Stock/Requirements List as of 09:47 hrs

Show Overview Tree | Sales Order | ASN Trailer | Status | Hot Call Ind. | Sng-Item, Sng-Inf | Overall Stock | Sng-Purch Docs | Sng-Material Docs | Sng-Part Analysis Report

Material: 7431137-06 | LK WAISTLINE COVER DOOR RR ALLUM. HGL.
MRP area: MC10
Plant: MC10 | MRP type: P1 | Material Type: 1102 | Unit: EA | ALE_CAD010 03/03/21

A. Date	MRP ...	MRP element data	Reschedul...	E... Receipt/Reqmt	Available Qty	St...
08/31/2021	Stock				7	
08/31/2021	Safety St	Safety Stock			10-	3-
08/27/2021	SchAgr	F3KH9K8G /00001 *			28	25
08/27/2021	SchAgr	F3KH9K8G /00001 *	08/30/2021 13		1	26
08/27/2021	SchAgr	F3KH9K8G /00001 *	08/30/2021 13		1	27
08/31/2021	ShpM	0185312958/F3KH9K8G	08/30/2021 13		20	47
08/31/2021	SchAgr	F3KH9K8G /00001 *			60	107
08/31/2021	DepReq	Individual Reqmt			17-	90 FLT1
09/01/2021	SchAgr	F3KH9K8G /00001 *			60	150
09/01/2021	DepReq	24 Individual Reqmt			24-	126 FLT1
09/02/2021	DepReq	11 Individual Reqmt			11-	115 FLT1
09/03/2021	DepReq	69 Individual Reqmt			69-	46 FLT1
09/04/2021	DepReq	3 Individual Reqmt			3-	43 FLT1
09/07/2021	End of Planning Tim.					
09/07/2021	SchAgr	F3KH9K8G /00001			60	103
09/07/2021	DepReq	2 Individual Reqmt			2-	101 FLT1
09/08/2021	DepReq	507			1-	100 FLT1
09/09/2021	SchAgr	F3KH9K8G /00001			60	140
09/09/2021	DepReq	31 Individual Reqmt			31-	129 FLT1
09/10/2021	DepReq	53 Individual Reqmt			53-	76 FLT1
09/11/2021	DepReq	23 Individual Reqmt			23-	53 FLT1
09/13/2021	IndReq	02 /HSTAI5_50			4-	49
09/13/2021	IndReq	02 /HSTAI5_50			8-	41
09/14/2021	SchAgr	F3KH9K8G /00001			60	101
09/15/2021	IndReq	02 /HSTAI5_50			4-	97
09/15/2021	IndReq	02 /HSTAI5_50			9-	88
09/16/2021	SchAgr	F3KH9K8G /00001			60	140
09/16/2021	IndReq	02 /HSTAI5_50			11-	137
09/16/2021	IndReq	02 /HSTAI5_50			24-	113
09/17/2021	SchAgr	F3KH9K8G /00001			60	173

Material Config.

Safety Stock

Planning Time Fence

Safety Time

Planning Calendar

?

Material Transaction

Demand Date

MRP Element

Change Qty

Total Qty

?

Credit: FhG team - Rulebook



Exception 7 – Supplier past due (Supplier_Past_Due)

Advance Shipping Notification (ASN) is not in SAP. The scheduled agreement for a prior day has not changed to a shipping note.

When: The scheduled agreement for a prior day (to today) has not changed to a ship note. And the scheduled agreement has exception 7.

Recommendation: Confirm if supplier is past due and confirm ASN is correct and in SAP. Verify production coverage and add to the next regular truck or expedite if needed.

A. Date	MRP ...	MRP element data	Reschedu...	E... Receipt/Reqr...	Available Qty	St...
08/31/2021	Stock				1,133	
08/31/2021	Safety Stock				60	1,073
08/31/2021	SchAgr	000331745/00001			60	1,133
08/31/2021	SchAgr	000331745/00001	08/30/2021		640	1,973
08/31/2021	DepReq	534 Individual Reqst			534	1,439 PSLT
09/01/2021	SchAgr	000331745/00001	08/31/2021		780	2,219
09/01/2021	DepReq	701 Individual Reqst			701	1,518 PSLT
09/02/2021	SchAgr	000331745/00001			840	3,058
09/02/2021	DepReq	700 Individual Reqst			700	1,338 PSLT
09/03/2021	End of Planning Tim					
09/03/2021	SchAgr	000331745/00001			720	3,078
09/03/2021	DepReq	717 Individual Reqst			717	1,361 PSLT
09/04/2021	SchAgr	000331745/00001			720	2,081
09/04/2021	DepReq	547 Individual Reqst			547	1,514 PSLT
09/07/2021	SchAgr	000331745/00001			660	2,174
09/07/2021	DepReq	712 Individual Reqst			712	1,445 PSLT
09/08/2021	SchAgr	000331745/00001			720	2,192
09/08/2021	DepReq	683 Individual Reqst			683	1,499 PSLT
09/09/2021	SchAgr	000331745/00001			600	2,099
09/09/2021	DepReq	694 Individual Reqst			694	1,405 PSLT
09/10/2021	SchAgr	000331745/00001			600	2,005
09/10/2021	DepReq	694 Individual Reqst			694	1,311 PSLT
09/11/2021	SchAgr	000331745/00001			720	2,031
09/11/2021	DepReq	516 Individual Reqst			516	1,445 PSLT
09/12/2021	SchAgr	000331745/00001			660	2,105
09/13/2021	IndReq	01 /MSTALIS_30			339	1,746
09/13/2021	IndReq	01 /MSTALIS_30			143	1,623
09/13/2021	IndReq	02 /MSTALIS_30			66	1,557
09/13/2021	DepReq	108 Individual Reqst			108	1,449 PSLT
09/14/2021	SchAgr	000331745/00001			720	2,169

Material Config.
Safety Stock
Planning Time Fence
Safety Time
Planning Calendar
?

Material Transaction
Demand Date
MRP Element
Change Qty
Total Qty
?

Supply
Purchase Order #
Trailer ID
Source of Shipment
Dest. of Shipment
ETA to Dest.
Supply TS
Weather
Traffic
?

Credit: FhG team - Rulebook



Exception 15 – Postpone Order (Scenario # 1 - Ignore_Exception)

Delay an order because the total inventory is over what the safety lead time value coverage is for that part.

When: There is a scheduled agreement with a 15 exception, There are future Dep Requirements with Receipt/Reqmt greater than the exception quantity

Recommendation: Ignore this message unless there is management direction to push out the deliveries.

A. Date	MRP ... MRP element data	Reschedu...	Exc...	Receipt/Reqmt	Available Qty	St...
08/27/2021	Stock				29	
08/27/2021	Safety Stock				23	
08/27/2021	Shpmt: 0193261642/FH3F3H			12	35	
08/27/2021	DepReq 5 Individual Reqmt			5	30	PLT1
08/28/2021	DepReq 4 Individual Reqmt			6	24	PLT1
08/29/2021	DepReq 3 Individual Reqmt			3	21	PLT1
08/31/2021	Shpmt: 0191299441/FH3F3H			18	39	
08/31/2021	DepReq 4 Individual Reqmt			6	33	PLT1
09/01/2021	DepReq 4 Individual Reqmt			4	29	PLT1
09/02/2021	DepReq 004			1	28	PLT1
09/03/2021	DepReq 8 Individual Reqmt			6	34	
09/03/2021	DepReq 8 Individual Reqmt			8	26	PLT1
09/07/2021	End of Planning Tim...					
09/07/2021	SchAgr FH3F3H /00001			6	32	
09/07/2021	DepReq 2 Individual Reqmt			2	30	PLT1
09/08/2021	DepReq 5 Individual Reqmt			5	25	PLT1
09/09/2021	IndReq 02 /NSTA15_50			4	21	
09/09/2021	DepReq 3 Individual Reqmt			3	18	PLT1
09/10/2021	SchAgr FH3F3H /00001			30	48	
09/10/2021	IndReq 02 /NSTA15_50			5	43	
09/11/2021	IndReq 02 /NSTA15_50			4	39	
09/13/2021	IndReq 02 /NSTA15_50			6	33	
09/14/2021	SchAgr FH3F3H /00001			12	45	
09/14/2021	IndReq 02 /NSTA15_50			3	42	
09/15/2021	IndReq 02 /NSTA15_50			10	32	
09/16/2021	IndReq 02 /NSTA15_50			8	24	
09/16/2021	IndReq 01 /NSTA15_50			2	22	
09/17/2021	SchAgr FH3F3H /00001			24	46	
09/17/2021	IndReq 02 /NSTA15_50			5	41	
09/18/2021	IndReq 02 /NSTA15_50			2	39	

Material Config.

Safety Stock

Planning Time Fence

Safety Time

Planning Calendar

?

Material Transaction

Demand Date

MRP Element

Change Qty

Total Qty

?

Supply

Purchase Order #

Trailer ID

Source of Shipment

Dest. of Shipment

ETA to Dest.

Supply TS

Weather

Traffic

?

Credit: FhG team - Rulebook



Exception 15 – Postpone Order (Scenario # 2 - Zero_Out_Exception_15)

Delay or reduce the quantity because you don't need those parts based on the configured settings.

When: There is a scheduled agreement with a 15 exception, There future DepRqmt with Receipt/Reqmt are less than the available inventory + the exception quantity

Recommendation: Zero out the receipt requirement of the scheduled agreement having the exception.”

A. Date	MRP ... MRP element data	Reschedu...	Exc...	Receipt/Reqmt	Available Qty	St...
08/27/2021	Stock				25	
08/27/2021	Safety Stock				6-	23
08/27/2021	Shpmt: 0185291662/F303F3H				12	35
08/27/2021	DepReq 5 Individual Reqmt				5-	30 PTLI
08/28/2021	DepReq 6 Individual Reqmt				6-	24 PTLI
08/30/2021	DepReq 3 Individual Reqmt				3-	21 PTLI
08/31/2021	Shpmt: 0185299441/F303F3H				18	39
08/31/2021	DepReq 6 Individual Reqmt				6-	33 PTLI
09/01/2021	DepReq 4 Individual Reqmt				4-	29 PTLI
09/02/2021	DepReq 006				1-	28 PTLI
09/03/2021	Aggr F303F3H /00001 *	09/07/2021 15			6	34
09/03/2021	DepReq 8 Individual Reqmt				8-	26 PTLI
09/07/2021	End of Planning Tim.					
09/07/2021	SchAggr F303F3H /00001				6	32
09/07/2021	DepReq 2 Individual Reqmt				2-	30 PTLI
09/08/2021	DepReq 5 Individual Reqmt				5-	25 PTLI
09/09/2021	IndReq 02 /HSTA19_50				4-	21
09/09/2021	DepReq 3 Individual Reqmt				3-	19 PTLI
09/10/2021	SchAggr F303F3H /00001				30	48
09/10/2021	IndReq 02 /HSTA19_50				5-	43
09/11/2021	IndReq 02 /HSTA19_50				4-	39
09/13/2021	IndReq 02 /HSTA19_50				6-	33
09/14/2021	SchAggr F303F3H /00001				12	45
09/14/2021	IndReq 02 /HSTA19_50				3-	42
09/15/2021	IndReq 02 /HSTA19_50				10-	32
09/16/2021	IndReq 02 /HSTA19_50				8-	24
09/16/2021	IndReq 01 /HSTA19_50				2-	22
09/17/2021	SchAggr F303F3H /00001				24	46
09/17/2021	IndReq 02 /HSTA19_50				5-	41
09/18/2021	IndReq 02 /HSTA19_50				2-	39

Material Config.

Safety Stock

Planning Time Fence

Safety Time

Planning Calendar

?

Material Transaction

Demand Date

MRP Element

Change Qty

Total Qty

?

Supply

Purchase Order #

Trailer ID

Source of Shipment

Dest. of Shipment

ETA to Dest.

Supply TS

Weather

Traffic

?

Credit: FhG team - Rulebook



Exception 30 – Potential shortage, requirement increase in PTF (Scenario # 1 - Ignore_Potential_Shortage)

For a scheduled agreement outside the planning time fence we believe the quantity should be added to an earlier shipment within the planning time fence if today is the day before the next the pickup date.

When: For the available stock at the end of the previous day before the last shipment inside the planning time fence, If the number of days covered including available safety stock is greater than the number of days to the next delivery date + 1.

Recommendation: Production is covered, pull in is up to planner discretion.

Material Config.	Material Transaction
Safety Stock	Demand Date
Planning Time Fence	MRP Element
Safety Time	Change Qty
Planning Calendar	Total Qty
?	?

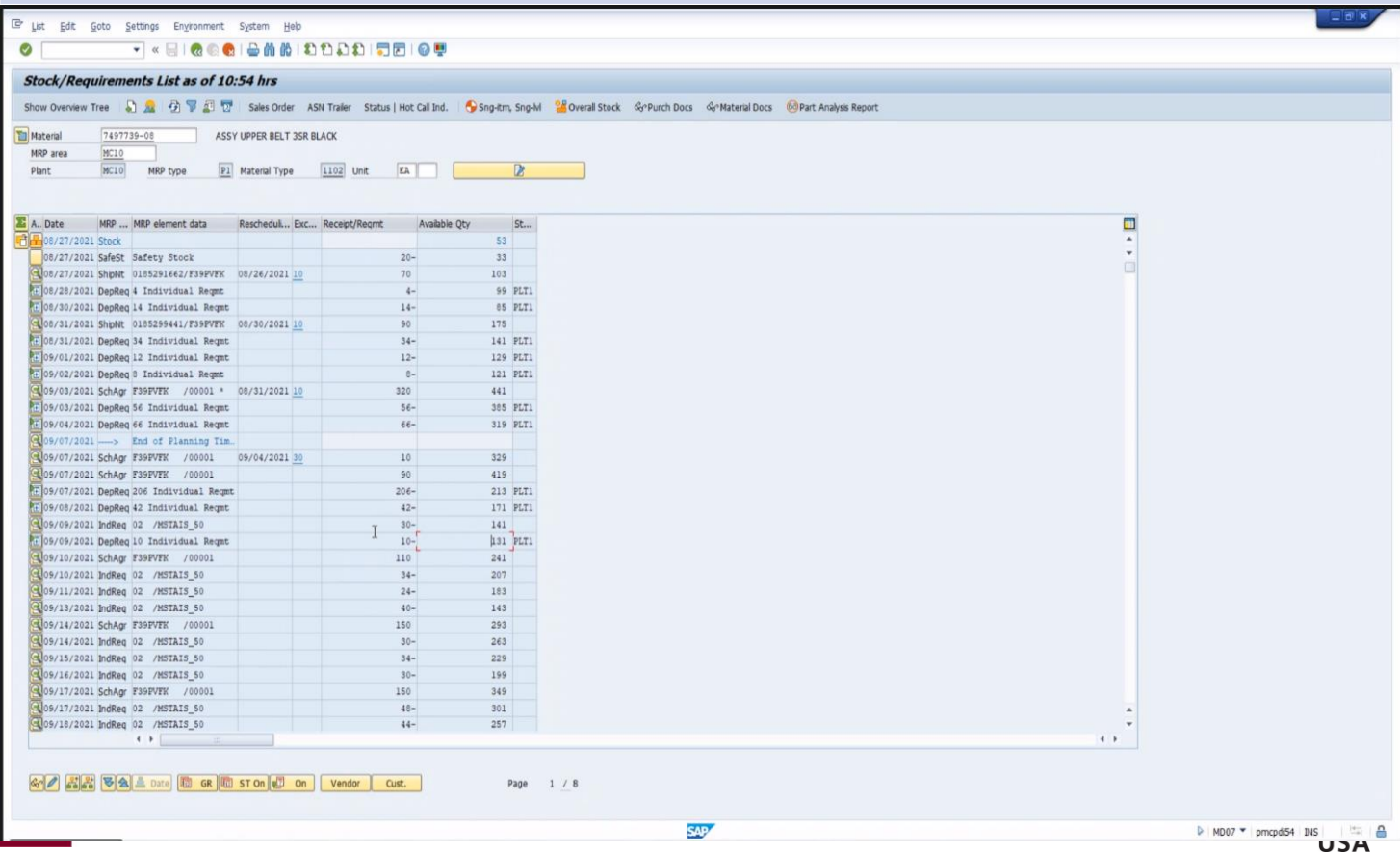
Credit: FhG team - Rulebook

Exception 30 – Potential shortage, requirement increase in PTF (Scenario # 2 - Pull_In_Shortage_Quantity)

For a scheduled agreement outside the planning time fence we believe the quantity should be added to an earlier shipment within the planning time fence if today is the day before the next the pickup date.

When: For the available stock at the end of the previous day before the last shipment inside the planning time fence, If the number of days covered including available safety stock is less than or equals the number of days to the next delivery date And today is before the pickup date, (where Pickup date := scheduled agreement date - Planned delivery time)

Recommendation: “ Add the exception message receipt/requirement to the next scheduled agreement date after today. If the receipt/reqmnt quantity is less than the safety stock then this message was created is due to safety stock on the part. “



A. Date	MRP ...	MRP element data	Reschedul...	Exc...	Receipt/Reqmt	Available Qty	St...
08/27/2021	Stock					53	
08/27/2021	Safety Stock				20~	33	
08/27/2021	Shpmt	0185291662/F39PVEK	08/24/2021 10		70	103	
08/28/2021	DepReq 4	Individual Regmt			4~	99	PLT1
08/30/2021	DepReq 14	Individual Regmt			14~	85	PLT1
08/31/2021	Shpmt	0185299441/F39PVEK	08/30/2021 10		90	175	
08/31/2021	DepReq 34	Individual Regmt			34~	141	PLT1
09/01/2021	DepReq 12	Individual Regmt			12~	129	PLT1
09/02/2021	DepReq 8	Individual Regmt			8~	121	PLT1
09/03/2021	SchAg	F39PVEK /00001 *	08/31/2021 10		320	441	
09/03/2021	DepReq 56	Individual Regmt			56~	305	PLT1
09/04/2021	DepReq 66	Individual Regmt			66~	319	PLT1
09/07/2021	End of Planning Tim...						
09/07/2021	SchAg	F39PVEK /00001	09/04/2021 30		10	329	
09/07/2021	SchAg	F39PVEK /00001			90	419	
09/07/2021	DepReq 206	Individual Regmt			206~	213	PLT1
09/08/2021	DepReq 42	Individual Regmt			42~	171	PLT1
09/09/2021	IndReq 02	/HSTA19_50			30~	141	
09/09/2021	DepReq 10	Individual Regmt			10~	131	PLT1
09/10/2021	SchAg	F39PVEK /00001			110	241	
09/10/2021	IndReq 02	/HSTA19_50			34~	207	
09/11/2021	IndReq 02	/HSTA19_50			24~	183	
09/13/2021	IndReq 02	/HSTA19_50			40~	143	
09/14/2021	SchAg	F39PVEK /00001			150	293	
09/14/2021	IndReq 02	/HSTA19_50			30~	263	
09/15/2021	IndReq 02	/HSTA19_50			34~	229	
09/16/2021	IndReq 02	/HSTA19_50			30~	199	
09/17/2021	SchAg	F39PVEK /00001			150	349	
09/17/2021	IndReq 02	/HSTA19_50			48~	301	
09/18/2021	IndReq 02	/HSTA19_50			44~	257	

Material Config.	Material Transaction
Safety Stock	Demand Date
Planning Time Fence	MRP Element
Safety Time	Change Qty
Planning Calendar	Total Qty
?	?

Exception 30 – Potential shortage, requirement increase in PTF (Scenario # 3 -Expedite_ Shortage_Quantity)

For a scheduled agreement outside the planning time fence we believe the quantity should be added to an earlier shipment within the planning time fence if today is the day before the next the pickup date.

When: The available stock at the end of the previous day before the last shipment inside the planning time fence, If the number of days covered including available safety stock is less than or equals the number of days to the next delivery date And today is equal to or after the pickup date (where Pickup date := scheduled agreement date - Planned delivery time),

Recommendation: Create an expedite order for Receipt/Reqmt in the exception.”

A. Date	MRP ...	MRP element data	Reschedul...	Exc...	Receipt/Reqmt	Available Qty	St...
08/27/2021	Stock					53	
08/27/2021	Safety Stock				20~	33	
08/27/2021	Shipmt	0185291662/F39PVEK	08/24/2021 10		70	103	
08/28/2021	DepReq 4	Individual Reqmt			4~	99	PLT1
08/30/2021	DepReq 14	Individual Reqmt			14~	85	PLT1
08/31/2021	Shipmt	0185299441/F39PVEK	08/30/2021 10		90	175	
08/31/2021	DepReq 34	Individual Reqmt			34~	141	PLT1
09/01/2021	DepReq 12	Individual Reqmt			12~	129	PLT1
09/02/2021	DepReq 8	Individual Reqmt			8~	121	PLT1
09/03/2021	SchAg	F39PVEK /00001 *	08/31/2021 10		320	441	
09/03/2021	DepReq 56	Individual Reqmt			56~	305	PLT1
09/04/2021	DepReq 66	Individual Reqmt			66~	319	PLT1
09/07/2021	End of Planning Tim...						
09/07/2021	SchAg	F39PVEK /00001	09/04/2021 30		10	329	
09/07/2021	SchAg	F39PVEK /00001			90	419	
09/07/2021	DepReq 206	Individual Reqmt			206~	213	PLT1
09/08/2021	DepReq 42	Individual Reqmt			42~	171	PLT1
09/09/2021	IndReq 02	/HSTA19_50			30~	141	
09/09/2021	DepReq 10	Individual Reqmt			10~	131	PLT1
09/10/2021	SchAg	F39PVEK /00001			110	241	
09/10/2021	IndReq 02	/HSTA19_50			34~	207	
09/11/2021	IndReq 02	/HSTA19_50			24~	183	
09/13/2021	IndReq 02	/HSTA19_50			40~	143	
09/14/2021	SchAg	F39PVEK /00001			150	293	
09/14/2021	IndReq 02	/HSTA19_50			30~	263	
09/15/2021	IndReq 02	/HSTA19_50			34~	229	
09/16/2021	IndReq 02	/HSTA19_50			30~	199	
09/17/2021	SchAg	F39PVEK /00001			150	349	
09/17/2021	IndReq 02	/HSTA19_50			48~	301	
09/18/2021	IndReq 02	/HSTA19_50			44~	257	

Material Config.
Safety Stock
Planning Time Fence
Safety Time
Planning Calendar
?

Material Transaction
Demand Date
MRP Element
Change Qty
Total Qty
?

Exception 10 – Firmed order is too late.(Scenario # 1 - Ignore_Exception_10)

The Planning time fence enables the ability to not have any changes to a supplier within a certain time frame. For example, if a supplier picks up on Wednesday and Friday. SchAgr (Schedule Agreements) represent the quantity that is sent to the supplier via EDI. As we progress through the week Schedule Agreements move into the Planning Time Fence. If changes are needed when the Agreement is within the Planning Time Fence, SAP cannot automatically change the agreement. Without the planning time fence, when MRP is run, if there is a demand increase the system will add the difference to a Scheduled Agreement . The Planning time fence creates a hard barrier so that the material controller needs to make modifications themselves, MRP cannot make the changes. Within the Planning time fence, the order is firmed. When a Firmed order is too late, the pieces need to be pulled in sooner. The quantity coming from the supplier is arriving too late. The exception message will stay until the quantity arrives from the supplier Setting up an expedite will clear the exception. For suppliers with longer lead times you must think a week ahead.

When: For the available stock at the end of the previous day to the exception, If the number of days covered is greater than the number of days to the next delivery date.

Recommendation: Production is covered through the next delivery, ensure there is no delay with the shipment.

Material Config.	Material Transaction
Safety Stock	Demand Date
Planning Time Fence	MRP Element
Safety Time	Change Qty
Planning Calendar	Total Qty
?	?

Exception 10 – Firmed order is too late.(Scenario # 2 - Expedite_Order_for_Exception_10)

If there is any risk to production that parts will not be available we have the green light to do an expedite. Especially if we can't get parts added to a truck because they are within the planning time fence. The exception message will stay until the quantity arrives from the supplier. Setting up an expedite will clear the exception. For suppliers with longer lead times you must think a week ahead.

When: For the available stock at the end of the previous day to the exception, If the number of days covered including available safety stock is less than or equals the number of days to the next delivery date

Recommendation: “Production is not covered through the next delivery date, please create expedited order for the expected shipment quantity. “

Material Config.	Material Transaction
Safety Stock	Demand Date
Planning Time Fence	MRP Element
Safety Time	Change Qty
Planning Calendar	Total Qty
?	?

2 Best Practice

- Recommend best practices for the material planner
- Questions to be investigated
 - What are the root causes of some of the highly generated exception messages?
 - How could we reduce/avoid the generated exception messages in order to reduce the material planner effort?
 - How can we validate that the recommended best practices are effective?

Cost Savings Analysis	Value
Actual Numbers	
Exception Messages Past 45 Days Total	5,200,000
% of Safety Stock Messages	50%
Exception Messages Past 45 Days Remaining	2,600,000
Average # of Seconds to Process Each Message	10
Total # Seconds for ALL Messages	26,000,000
Total # Minutes for ALL Messages	433,333.33
Total # of Hours for ALL Messages	7,222.22
Hours Per Day To Process	160.49
Plan Numbers	
Total # of Hours 1 Planner 1 Year	2080
Total \$ One Head	\$ 135,000.00
Cost Per Hour	\$ 64.90
Total Cost of Exception Message	\$ 10,416.67
Est % of Reduction	20%
Savings Per Day	\$ 2,083.33
Savings Per Year	\$ 541,666.67

Part Ranking

- A part ranking algorithm using Markov Chain is being developed
- Based on historical data, we will be able to calculate the probability that an order will be early or late and by how many days for the next delivery.

Data Needed

- Supplier number
- Part number/description
- Expected receipt date
- Actual receipt date

Data Extracted From

- Zgrve Reports
 - Material (part #)
 - Supplier #
 - GR date (actual receipt date)
- MD04 Reports
 - Material
 - Demand_Date/"ShipNt" in MRP Element