

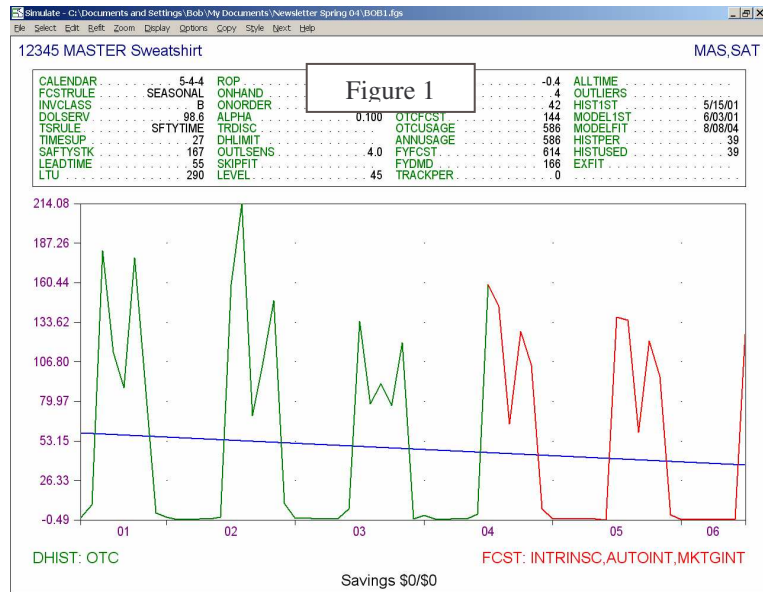
# Inventory and Replenishment Planning Article – Fall 2004

## Better Service for Very Seasonal Products Using Safety Time

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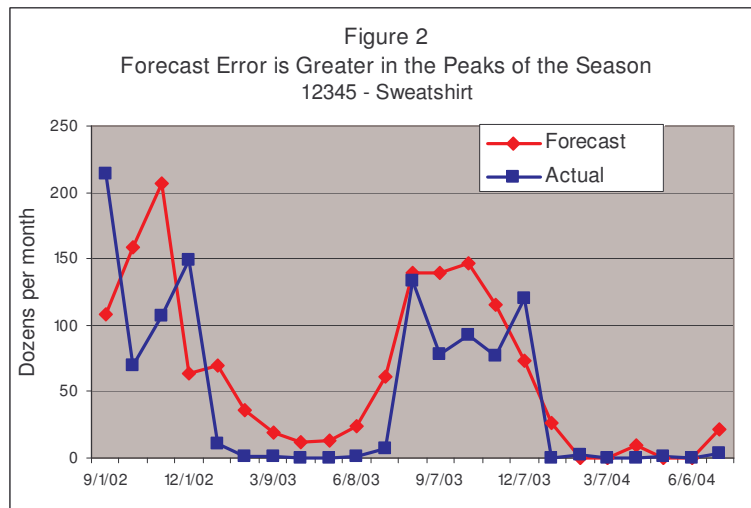
Do you have products with very significant seasonality? Do you have too much safety stock in the low season and not enough when the demand peaks?

If your products are toys, will your customers accept a lower service level at the peak of the Christmas season? In the middle of July will an HVAC customer in need of a new air conditioning unit accept a backorder or call your competition? If you sell sweatshirts (see Figure 1), do your customers care more about your service in the spring or fall?



FGS users sometimes observe that forecast error is greater in the peak months of the seasonal cycle than in the low months (See Figure 2) for SKUs with significant seasonality. A fixed statistical safety stock meets the service target on the average for the year, but fails to do so during the peak. There are small changes to the safety stock over time as the forecast revision process applies exponential smoothing to the error (and therefore the safety stock), but these are gradual changes and not intended to accommodate significant abrupt changes to the error.

In such cases the FGS *Safety Time* facility can be helpful. In the Inventory Planning module, Safety Time enables the statistical safety stock to rise and fall with the seasons (see Figure 3), while maintaining the same average inventory over the course of a year. This adjustment to the safety stock takes place with each revision. If you are also running the FGS Replenishment Planning module, it uses the Safety Time to compute a time-phased safety stock by week. The resulting replenishment plan reflects these varying targets, which means the timing and/or quantities (as well as need dates) of the planned orders adjust accordingly.



If your MRP system accepts safety time or a time-phased safety stock, an interface can provide safety stock expressed in days or weekly safety stock values with their corresponding dates. The reorder point (SKU.ROP) adjusts automatically. If your MRP system cannot accept time-phased safety stock, you can plan your inventory replenishments using the FGS Replenishment Planning module (see Figure 5).

## Safety Time

*Safety Time* in FGS is an option to express the statistical safety stock in terms of forecast days forward. Safety Time safety stock climbs in anticipation of the peak season and falls as the SKU goes into the low period (see figure 3).

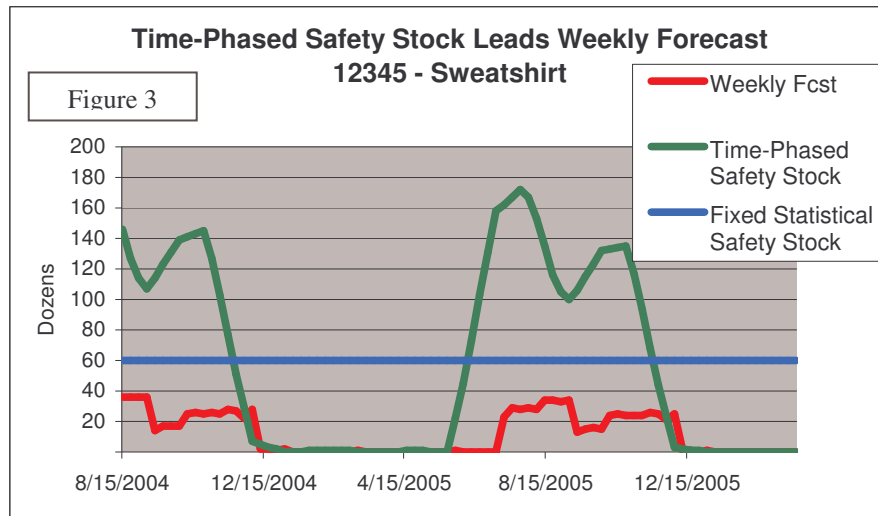


Figure 4 illustrates the steps to calculate the Safety Time safety stock in this example.

Figure 4

Forecast error adjusted for lead time (times) Safety factor	SKU.STDEVL SKU.SFACTOR	42 1.43
Statistical safety stock	initial SKU.OTCSS	60
Next 12 months' forecast (divide) Number of sales days per year	SKU.OTCUSAGE 52 X OPTION.LTD	586 260
Forecast per day		2.25
Statistical safety stock (divide) Forecast per day	initial SKU.OTCSS	60 2.25
Safety Time safety stock in days	SKU.TIMESUP	27
Safety Time safety stock in units	DAYSFCST SKU.TIMESUP	167

Each forecast period the safety stock is calculated as that number of days' supply of the current OTC forecast. In this example, the forecast for the next six weeks is 36, 36, 36, 36, 14, and 17, respectively. So a 27 day (5.5 weeks) forecast would be 167 units.

## Safety Time Using Replenishment Planning Logic

In the Replenishment Planning module, FGS projects the safety time into the future as a time-phased safety stock. The planned replenishment quantities consider both the seasonal forecast and the seasonal safety stock when calculating the planned replenishments (see Figure 5).

Figure 5

Mfg Days	Period Ending	Forecast			Target			Replenishments		Stock On Hand		
		OTC	Sched	Depend	Service	Mfg	Change	Firm	Planned	Planned (Ending)	Planned in days	Available Above ServTgt
PartNum	Descript	Loc Name	LeadTime	PlanRule	RLQ	ReplFreq	MinLotQ	LOTINCR	Start Dt	NthWkDay	Plan To	ShipDays
12345	Sweatshirt	MASTER	55	MINRLQ	81.25	5.8	56	56	12/30/1900		DATE	0
Total OH	Alloc OH	On Hand	On Order									
0	0	304	82									
<b>Time-Phased Safety Stock</b>												
As of	8/8/2004				165			165			304	139
	8/15/2004	36			148			-19			268	122
	8/22/2004	36			127			-19			232	105
	8/29/2004	36			114			-13			196	82
	9/5/2004	36			107			-7			160	53
4	9/12/2004	14			114			7			146	32
	9/19/2004	17			123			9	82		211	88
	9/26/2004	17			131			8			194	63
	10/3/2004	17			139			8			177	38
	10/10/2004	25			141			2			152	11
	10/17/2004	26			143			2			126	-17
	10/24/2004	25			145			2			101	-44
<b>Leadtime</b>												
	10/31/2004	26			127			-18		81	156	29
	11/7/2004	25			103			-24			131	28
	11/14/2004	28			77			-26			103	26
	11/21/2004	27			51			-26			76	25
4	11/28/2004	22			29			-22			54	25
	12/5/2004	28			7			-22			26	19
	12/12/2004	2			5			-2			24	19
	12/19/2004	2			3			-2			22	19
3	12/26/2004	1			2			-1			21	19
4	1/2/2005	2						-2			19	19
	1/9/2005										19	19
	1/16/2005										19	19
4	1/23/2005				1			1			19	18
	1/30/2005				1						19	18
	2/6/2005				1						19	18
	2/13/2005				1						19	18

In this example, as the winter progress, the forecast and the safety stock decrease. The planned replenishment on October 31 provides enough inventory to meet the service goal and keep the projected inventory low until next summer when the wholesale demand and safety stock start to rise again.

## How to Calculate Safety Time

To calculate the Safety Time in FGS you must change the time supply rule (SKU.TSRULE) value from NONE to SFTYTIME, re-compute safety stock, and then optionally generate a replenishment plan. A command file template of this process is displayed below. You will need to enter paths and conditions to identify the SKUs needing variable safety stocks and enter a replenishment planning date if you do not wish to use the OPTION.LASTPER field or want to choose a specific replenishment planning date. Once the changes are made, FGS will automatically maintain the safety stock.

```
! CALCULATE Safety Time
! =====
! VERTICAL EDIT: Change the TSRULE from NONE to SFTYTIME
! =====
! Vertical edit
! RUN fnrun 'editrecver'
! Name of record type to be edited:
SKU - Stock keeping unit (a part at a location).
```

```

! Names of fields to be edited (or ALL)
TSRULE
! Select path
enter path
! Conditions
enter conditions
! Confirm each record as it is changed?
N
! Record Type: SKU
! Enter values to be inserted in these fields for all selected records.
! Vertical Edit
'SFTYTIME'
! Insert these values in the corresponding fields for all selected records?
Y
! =====
! RECOMPUTE: Safety stock values for the selected SKUS
! =====
! Inventory Planning
! Recompute for Finished Goods (OTC)
!RUN fmrn 'recalss'
! Enter a path which reaches SKU
!LASTPATH
! Conditions
!LASTCOND
! Remove time-supply safety stock, if any (answer NO to leave as is)?
N
! =====
! GENERATE: Replenishment plan for the selects SKUS
! =====
! Replenishment Planning
! Single Level -- Selected Parts
!RUN fmrn 'GenPlan1'
! Enter a path which reaches SKU
enter path
! OPTIONS,-PARTS,PS
! Select only master SKUs, at one level only.
enter conditions
! Enter the planning date (stock status "as of" date) to be used for all parts.
! This date must be on or after the forecast date for all parts.
! Planning date:
!XEQ OPTION.LASTPER
! Assume the stock will never arrive
! Ignore exploded dependent demand due on or before 1/05/03?
Y
! Ignore scheduled demand due on or before 1/05/03?
Y
! ----Intentionally left blank-----
! -----
! Main
!RESUME→

```

If you would like more information about this feature contact [FGS Technical Support](#).  
Connect to [E/Step software web site](#).