Inventory Optimization Tool (IOT)

User Guide

Version 6.0
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Why to assess your inventory?

It is important for organizations to determine where they are in their lean journey. Even though lean is over arching and spreads across the corporation for process changes and improvements, one area where it has immediate impact on is how the organization manages its inventory.

So Ultriva provides a self service tool to assess where you are with your inventory be it FG, WIP or RM. This Inventory Optimization Tool (IOT) takes your historical information – six months or one year or more – and points where and what to improve. You can assess supply chain, distribution and WIP independently depending on your inventory pain point. If you are a large corporation with multiple plants worldwide, you can do assessment for each plant to determine where to focus first. The Module not only highlights problem areas but also showcases the potential savings.

What is the information required to do the assessment?

In order to assess the inventory, it is important to provide the two sets of data:

Master Data File:

- Part Number (FG SKU or WIP SKU or R/M SKU)
- Part Description (optional)
- Vendor Name (Vendor Code will work as well) –Manufacturing plant, upstream work center, external supplier
- Standard Lot Size (number of units in a box, palette or bin)
- Price per unit of measure (Standard Cost used in MRP)
- Lead time (Should include supplier's lead time plus transit time)
- Closing Stock (current on hand inventory in units)

Transaction Data File:

- Part Number
- Transaction Quantity
- Transaction Date
- Transaction Type (C for consumption and R for Receipts)

The minimum date range for the transaction should be 60 days. The maximum should be one year.

Data format

Both these files should be provided in a tab delimited format with the first row being the column header for respective fields

Data Load

Here are the steps you should follow to load data in to IOT:

Go to http://leanassessment.kanban.com
Click on Register Now button at the bottom
Click Proceed to Registration button.
Complete all the fields with your company data
Click next and finish.

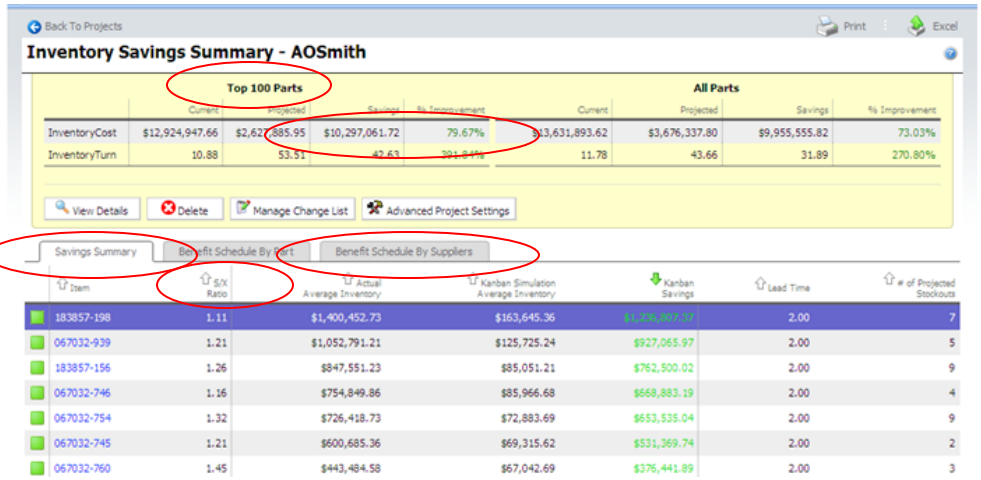
You should get a password via email that you registered with.
After you get the password go back to http://leanassessment.kanban.com
Login using the email address and password
You will see a sample analysis that you can use to browse.
To load your data click on CREATE PROJECT button
The system will take you through a wizard that will help you to load the data and view the results

How IOT works?

Inventory Optimization Tool uses a built in lean formula where Inventory size =(average consumption*(LT) + Safety Stock) and consumption of a lot size of material will trigger an equivalent replenishment. IOT then does an iterative processing of your data to do the following:

- It first maps out your consumption pattern over the date range you provided.
- It than takes closing on-hand inventory and calculates the on-hand inventory at each of the previous 60 days (90 or 180 or 365 depending on the transaction provided). As it establishes this data it figures out the potential stock outs that could have happened during that period.
- In the third step it uses lean methodology (consumption driven replenishment) to calculate the recommended replenishment pattern. It then projects the on-hand inventory for each of the previous 60 days (90 or 180 or 365 depending on the transaction provided).
- As a last step it superimposes Consumption (BLUE), On-hand inventory for current replenishment (RED), projected on-hand inventory for lean replenishment (GREEN) in a single graph.

Once you load the files the tool analyzes the data and displays the summary



S/X is the variability of consumption. If the number is less than 3 or 4 it is a good candidate for Kanban replenishment

The IOT also summarizes the analysis by calculating the overall savings, top 100 parts savings and supplier grouped savings.

In addition to calculating the savings the IOT calculate the following for each of the parts:

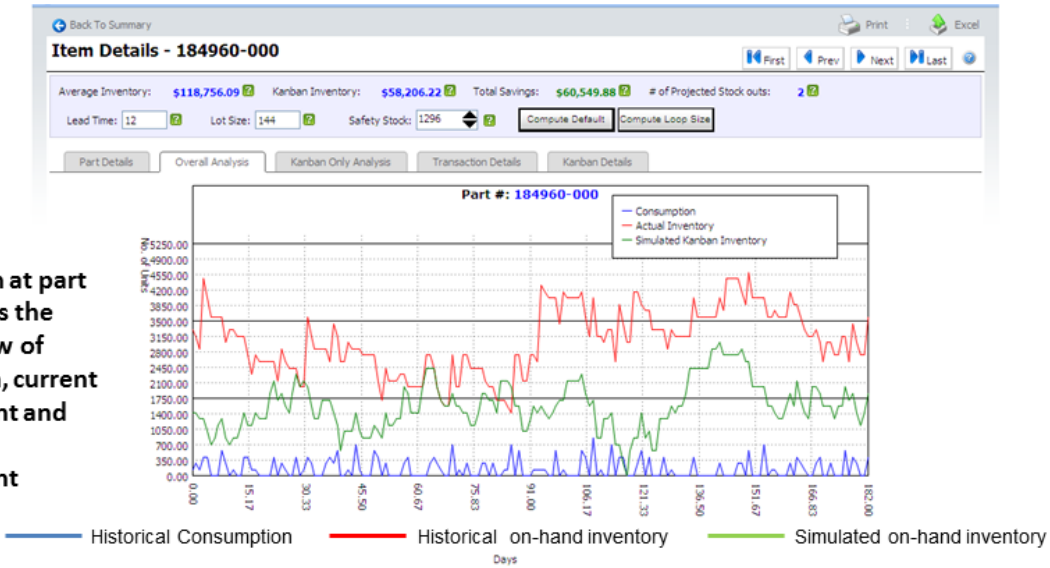
- Average Consumption for the period
- Variability of Consumption (S/X – Standard Deviation/Mean)
- Safety Stock

How to interpret IOT results?

The S/X ratio is a key factor in determining whether the consumption is consistent and repetitive. Normally a factor of less than 3 or 4 for a part (R/M, WIP, and FG) is considered a good candidate for trying Kanban replenishment. In addition if the factor is greater than four, then it is worth exploring the outliers in the consumption that is causing the s/x to be high prior to discarding the item.

Outliers can be deceptive in the ERP system. Wrong manual entry like entering 40,000 instead of 4000 could have forced an inventory adjustment which might get loaded as consumption of 36000 pieces in one day. So it is worth analyzing the graphs prior to determining which parts have consistent replenishment and which have sporadic ones. Here are some samples:

Drilling down at part level provides the graphical view of consumption, current replenishment and projected replenishment

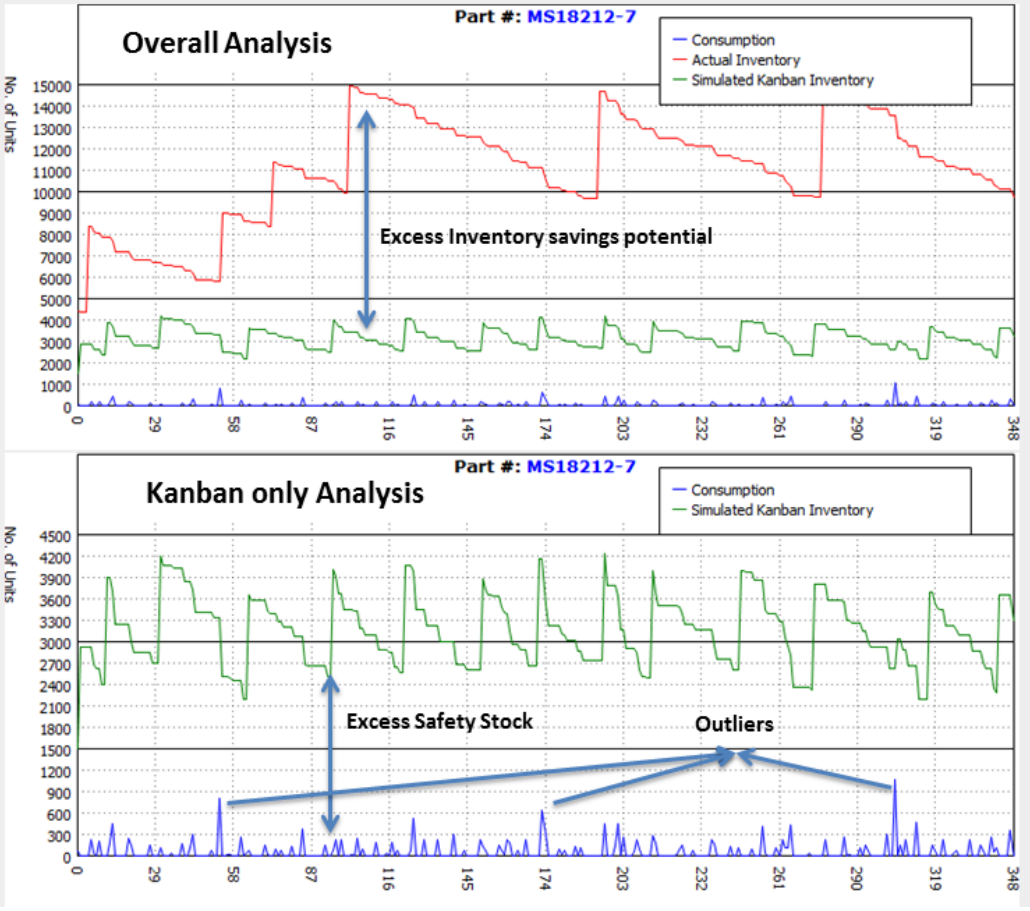


An opportunity to reduce the safety stock in the system.

S/X – 2.11
Average usage – 59.32
Lot Size – 1500
Lead time – 10 days

Observations:

- Current replenishment carries too much inventory
- Huge lot size - 3 times (Avg. usage X Lead time)
- Result in excess safety stock



The results showcases the opportunities for improvement. IOT allows you to do your own simulation by varying the values. For example, you can change the lot size in the above to a much smaller value and see what is the further savings you will get. How much safety stock you have to carry in order to satisfy this consumption pattern.

Listed below are further details on how to perform this simulation.

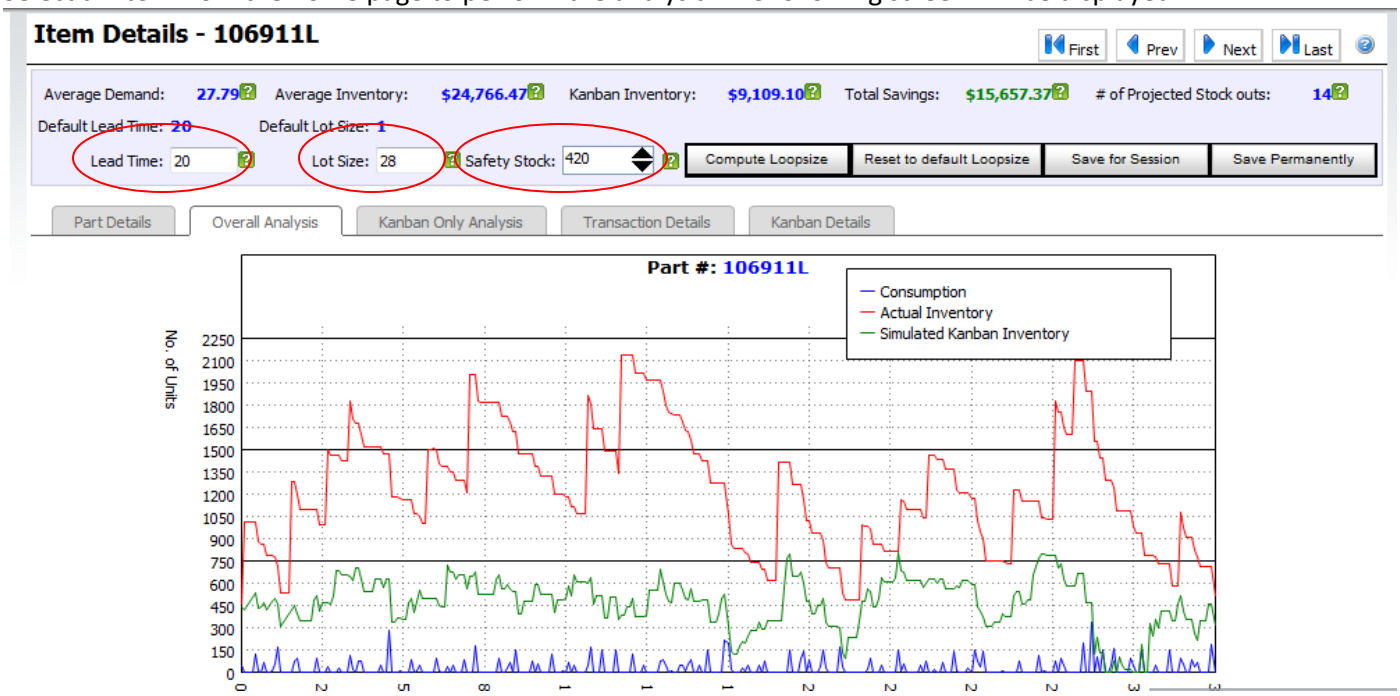
"What if" Analysis

The IOT also allows the user to perform a series of "What If" analysis:

There are two types of "What Ifs" IOT allows. One is on at an Item level through manual entry and the other is for the entire batch of items in the project

"What If" for individual item

Select an Item from the home page to perform the analysis. The following screen will be displayed.



Change lead time

If the part has a long lead time, then the user can change the lead time to see how the on-hand inventory will change and overall what effect it will have on the potential savings

Changing the lot size

In several instances the lot size can be several multiples of average use per day. This will automatically lead to higher inventory even if the lead time is short. The lot size should never exceed the multiple of lead time and average usage per day. For example: usage per day is 100 pieces and the lead time is 10 days, then the lot size should be less than 1000 (10 x 100) pieces. The ideal lot size should be one or two days of average usage per day. This helps companies to increase the inventory velocity resulting in overall improved turns

Change safety stock

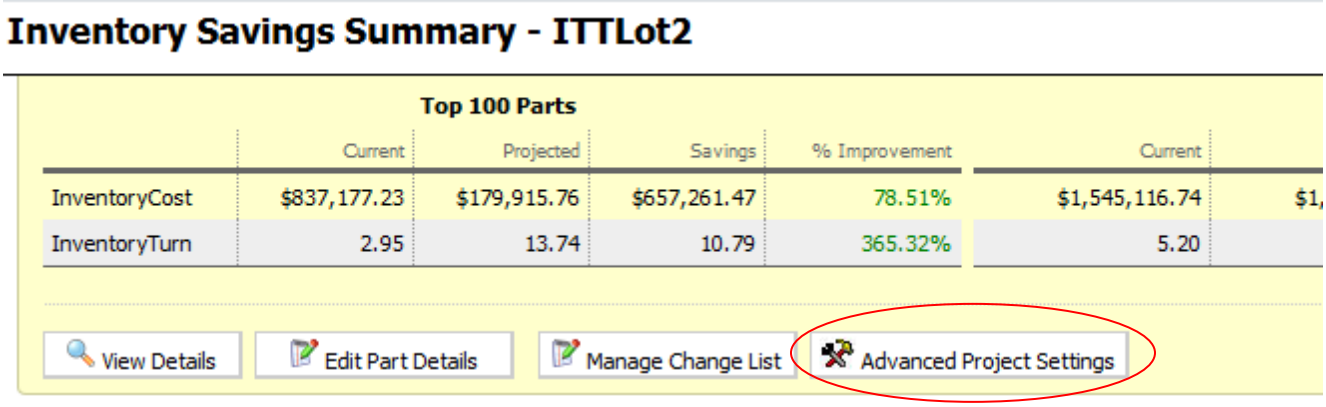
In IOT safety stock is always a multiple of lot size. So as mentioned above larger the lot size higher the safety stock you will be carrying. User can reduce the safety stock to see how many potential stock outs happens and where does it happen.

- Make the changes to one or more field values
- Click the “Compute Loopsize” button
- Retain these changes for the session by clicking “Save for session”. When the user logs out and logs back in the values would have reverted to the original loaded values.
- Permanently change the values in the project by clicking “Save Permanently”. This overwrites the loaded values.
- Click “Reset to Default Loopsize” button to return to original values

“What If” for batch of items

The following “What if” can be done a batch basis by changing the advanced settings:

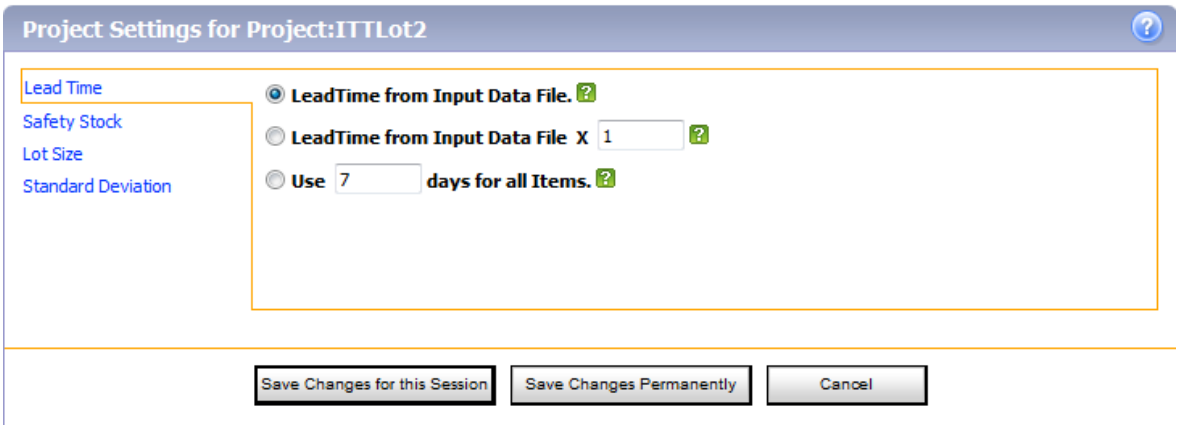
- Click the “Advanced Project Settings on the home page



The following screen will be displayed. The are four parameters that can be optimized across the project. They are Lead Time, Safety Stock, Lot Size and Standar devition. Each parameter alllows mutiple options.

Lead time

Shown below are the options for the Lead time.

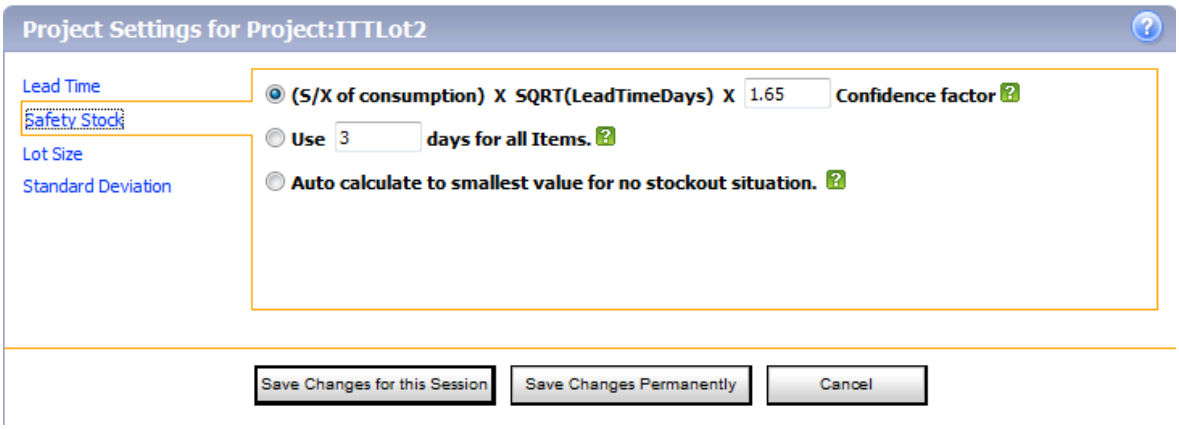


The default option is to take input from Item Master file. The other options include:

- A multiple of the loaded values. For e.g. the loaded values for lead time is in business days (5 days/week) and you want to convert that in to calendar days (7 days/week). You can then just put a multiple like 1.4 in that field
- Alternatively you want to put a one lead time value for all the parts. For e.g. you are currently getting all your goods from Asia where the transit component of lead time is 30 days. Suppose you want to move to air freight then you can reduce the overall lead time for the parts and assess whether the resulting reduction in inventory will more than compensate for the increae in freight.

Safety Stock

The second parameter is the safety stock computation. The default computation is the commonly used formula: Variability of consumption X SQRT of leadtime X confidence factor. The default value for the confidence factor is 1.65 which corelates to 90% confidence. You can change that and recompute.



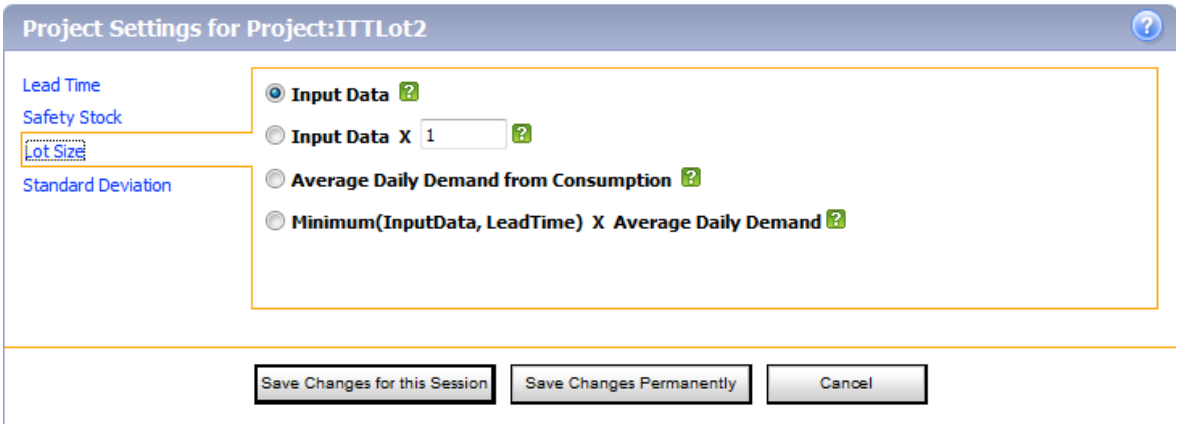
Other computations options include:

- Set number of days. For example you can state that you wish to carry 3 days of safety stock irrespective of usage or lead time.

- You can ask the system to compute safety stock for all historical consumptions. For example there are 300 consumption points averaging 50 pieces a day. Assume that on 5 occassions the consumption were 200 pieces or more. In a normal safety stock calculation the IOT will compute for 50 pieces and alert you stating that there may be 5 or 6 stock outs. While if you check the Auto Calculate for no stock out situation, then IOT will increase the safety stock to support this outliers

Lot Size

The third parameter is Lot Size. The default will be the data from the Item data file.

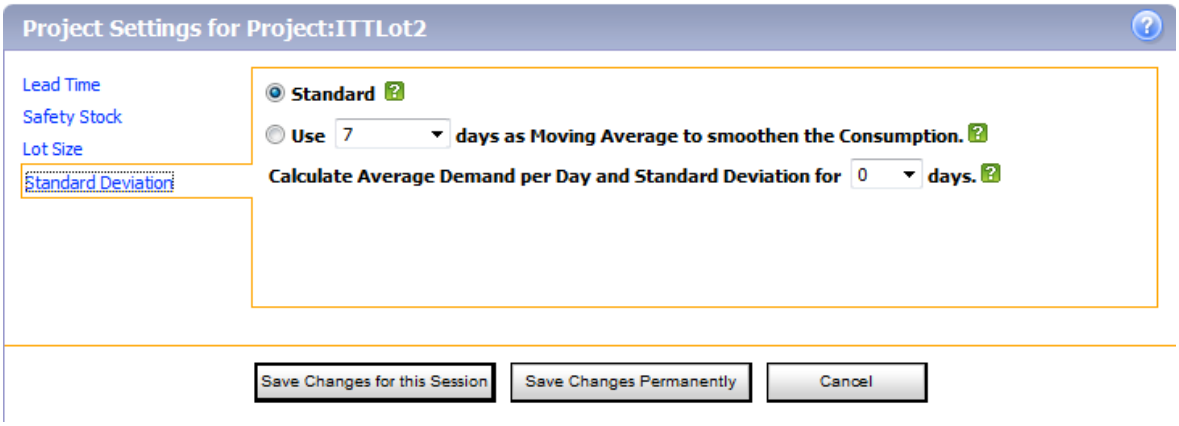


The other options are:

- A multiple of input lot size.
- If the user wants to simulate how much savings will be projected if the lot size is as small as one day's usage
- If the lot sizes are very large, then this option should be checked. It will take the input data for the parts where the lot size is less than Average usage X Lead time. For parts where the input data is greater then the lot size will be equal to Average usage X Lead time.

Standard Deviation

The last parameter is computation of standard deviation for calculating S/X (variability of consumption). The default is using standard formula.



The options are:

- Use moving average for a defined number of days. This helps if the consumption is lumped up instead of smooth. A case in point would be parts are used only once a week instead of daily.
- The second option is for situations where the historical data may be for 365 days but the relevance is only for last 90 days. So the system will compute the average usage and standard deviation only for the last 90 days.

- Retain these changes for the session by clicking “Save changes for this session”. When the user logs out and logs back in the values would have reverted to the original loaded values.
- Permanently change the values in the project by clicking “Save Changes Permanently”. This overwrites the loaded values.