

Spares Calculator Tutorial 1 Script

Introduction

Consider the following example. We work for a company called vPhone and vPhone are a national US mobile phone operator.

vPhone are about to upgrade their system by deploying improved power amplifiers and before they go into service they're going to need to find out how many spare parts they are going to need to buy.

vPhone have divided their support system into 50 regional support centres. One in each state across the United States of America.

Now, for simplicity we are going to assume that each support centre supports 1000 antenna towers. In real life they would support varying numbers. But this will make the mathematics much easier.

Each antenna tower operates 24 hours per day and is equipped with 6 power amplifiers. vPhone have agreed a 30 day collect-repair policy with the supplier.

This means that broken units will be collected by the manufacturer using a courier and returned within 30 days.

The manufacturer has also guaranteed an MTBF 250,000 hours and a NFF ratio of 5%.

Finally, each amplifier will cost \$2,100.

Let's enter the data into Spares Calculator.

Enter the Data

So here we are at Spares Calculator and to save time I'm going to open up a file that I prepared previously.

Let's start with the project data. We're calling the project the vPhone PAU 001. PAU stands for Power Amplifier Upgrade and we are looking at one single Generic Regional Store.

The equipment is the Tower Mounted Power Amplifier. This has a part number of JS-98-76 and it's made by a fictitious manufacturer called James.

Now let's look at the logistic data.

We've got 6000 units in service. That's 6 amplifiers multiplied by 1000 antenna towers. So 6 times 1000 gives us 6000 units in service.

They each operate for 24 hours per day and they have an MTBF of 250,000 hours.

They also have a NFF ratio of 5% and a repair turnaround time of 30 days.

Finally, they cost \$2,100 US dollars each.

Set the Optimization Goal

The next thing we need to do is set the optimization goal and there are two options here.

We can either choose Stock-Out-Risk or we can choose Mean-Time-Between-Stock-Out.

These goals are usually given to you by the sponsor, but for this example I'm going to assume that the sponsor has given us a MTBSO goal of 10 years.

So I need to enter 10 in this box here.

So that's it. All that we need to do now is hit calculate button.

View the Stock-Out-Risk Chart

Here are the results. The first thing we're going to look at is the Stock-Out-Risk chart.

This shows Spare Units on the X axis and Stock-Out-Risk on the Y axis.

View the MTBSO Chart

Let's switch to the Mean-Time-Between-Stock-Out chart.

Again, this shows Spare Parts on the X-axis and on the Y-axis we have the Mean-Time-Between-Stock-Out.

With this chart the Y-axis is logarithmic, so the first division shows 1-10 years and the next division shows 10-100 years.

And so on.

Now remember that we are looking for the number of spare parts that will give us a MTBSO of greater than 10 years.

So I'm going to find 10 years on the Y-axis and then I'm going to read off the number of spares that we need.

And we can see from this chart that we're going to need at least 29 spare units to meet our MTBSO goal of 10 years.

Take a Look at the Tabular Data

Let's take a look at the tabular data.

I'm going to click on the spares header to order the spares in descending order and I'm going to switch out the cost and stock-out-risk data so that we're not confused.

And again we can see from the tabular data that we're going to need 29 spare units to meet our MTBSO goal of 10 years.

We can also see the effect of holding 28 spares or 30 spares.

Take a Look at the Annotation Panel

Finally, Spares Calculator summarises all of this information in a handy annotation panel which is attached to the chart.

To expose the annotation panel you need to select this check box.

The annotation panel is divided into 6 regions.

The first region shows information about the project and store.

The second region shows information about the equipment.

The third region shows your logistic data.

The fourth region shows some high level logistic calculations.

The first parameter is the MTBR which stands for Mean Time Between Removals. This is derived from the MTBF and the NFF ratio and shows the mean number of hours that should elapse before equipment removal.

The next parameter is the Fleet Operating Time. This is derived by multiplying the number of units in service by daily operating hours and the repair delay. The total fleet operating time is equal to the total number of hours that the fleet of equipment will operate for whilst a unit is away for repair.

The final parameter is the Mean Number of Returns. This is derived by dividing the Fleet Operating Time by the MTBR and is equal to the average number of returns that you would expect during the repair delay period. In this case the repair delay is 30 days and Spares Calculator is telling us that during this time we should expect an average of 18.14 failures.

The fifth region shows our original optimization goal. You might also notice that Spares Calculator has converted the MTBSO goal into a SOR goal. In this case a MTBSO goal of 10 years converts to a SOR goal of 0.82%.

The sixth region shows the recommended number of Spares.

It also shows the total cost and the predicted MTBSO and SOR figures.

In this case 29 spare units should give us a stock-out-risk of 0.65% and a MTBSO of 12 years.

Take a look at the Reporting Process

Spares Calculator 3.0 has been designed specifically to simplify the reporting process.

Here's an example.

Let's say that we are producing a report for a customer or an internal sponsor.

First of all we can hide any unnecessary tabs by clicking on this checkbox.

Next we take a screen shot of the chart and annotation panel by clicking on this button here and we save it to our desktop.

Next, we open up our document, and insert our screenshot.

We can repeat this exercise for the tabular data, or we can insert a full screen shot by selecting export from the main menu and then select screenshot – full screen.

We can then save this to our desktop and finally we can insert it into our document.

Summary

Ok – to summarise

We started off by loading up our data. Then we set our optimization goal. We hit calculate, and we saved two screenshots. We then inserted these into our report.

And that's it.

That's how easy it is to forecast spare parts using Spares Calculator.

Thank you for watching.