DEMAND PULSE

SOFTWARE TOOL FOR INVENTORY DRIVEN BUSINESSES

NEVER AGAIN TOO MUCH ON THE SHELVES

Optimal inventory control with Demand Pulse

Inventory control is a key area in which companies can gain great benefits. Good inventory control saves all sorts of extra costs, enables regular production, and creates confidence among internal and external customers. To achieve this, the forecasting system must be sufficiently detailed, work with a short planning horizon, and take account of special periods such as national holidays and special actions.

By having the Demand Pulse module running in the background of the forecasting system, it is possible to determine which products should be manufactured or ordered, when and in what quantities, so as to ensure that these products can be delivered when the customer asks for them.

Non saleable slow moving stock

'What is on the shelf is not what customers want, and what the customers want is not on the shelf.'

In a nutshell, this is the problem that most companies have with inventory. It applies not only to companies that literally have their inventory on shelves such as bookshops, but also to restaurants and manufacturing companies.

There has always been a problem with inventory control, or, rather, how to ensure that you give optimal service to the customer with the least possible inventory. Counting and keeping written records formed the basis for this far into the last century. In the past, the interpretation of this data for managing the inventory was always done by hand. The businessman who knows intuitively whether he must order or manufacture many or few products, or the old warehouse boss who decides things on the basis of his experience - these are well-known examples from business life.

In the course of the last century, all functions in the area of inventory were automated, including the forecasting. That did not prove to be a guarantee of success. A painful example of this is the automated Central Workshop set up by the Amsterdam local authority in the last century to replace all small service garages. This was because Amsterdam had many different kinds of vehicles (cars, vans, dust carts, lorries, buses, etc.) of different makes. Every Amsterdam service had its own garage for the maintenance and repair of these vehicles, and that was very expensive.

The idea behind the Central Workshop was that by centralising all maintenance and repairs the costs would be lower. For this purpose, they first laid in an inventory of almost all the spare parts for the wide variety of vehicles. However, in practice, most of the articles in the inventory were not needed, while there was a demand for precisely those parts that were not in the inventory. This resulted in obsolete inventory and overfull shelves with superfluous parts. The consequence: interminable delays, and therefore dissatisfied customers - the local authority services – who increasingly circumvented the Central Workshop. This eventually had to close, and the inventory was sold at scrap value.

DEMAND PULSE BENEFITS:

- Higher level of service
- Reduced inventory
- Lower costs

Forecasting

The more accurate the forecast, the better the whole ordering and production process. However, precise sales forecasting is often subject to errors, and that has consequences, for example, for production. This directly affects production planning, and means that what is available does not match the demand from the customer. Because of this, production planning quickly changes into continual production re-adjustment with ultimately high levels of inventory, high costs, and a low level of service as a consequence.

There are several problem areas in forecasting that can quickly lead to deviations:

- The purchasing pattern of a product group can be predicted more accurately than that of an individual product. So, for making an accurate production plan for an individual product, more detail is needed.

- The length of the forecasting period: the longer the period to which the forecast applies, the less reliable the forecast.

- Special events - for example national holidays or special marketing actions - result in peaks that are often poorly anticipated.

Accurate forecasting

Cynax provides Demand Pulse to deal with the problem of unreliable forecasts. It is a statistical module for calculating the optimal inventory level and reorder quantity for every company that maintains inventory.

Demand Pulse indicates which products must be made, when and in what quantities, to ensure, with 95% or 98% certainty (selectable), that the products can be delivered when the customer requests them. With precise calculations, the inventory levels and replenishment volumes of specific products are much more accurately matched to future demand.

If demand falls, Demand Pulse automatically slows down the replenishment. And if demand increases, the module automatically speeds up replenishment. If the demand profile changes, Demand Pulse automatically follows this change. By having this module running in the background of the existing forecasting system, there is a constant indication of how the current estimate deviates from the optimal inventory and replenishment quantities. A constant check is thus maintained on the existing forecasting system.

It is therefore not a replacement of the existing system, but an independent observer. It provides a company with new decision points and handles for managing the inventory level and for having the right products on the shelf. This leads not only to lower inventory levels, but also to lower costs, shorter delivery times, and a generally more stable production and ordering process.

BUSINESS CASE VAN SCHAPPEN

Background

At a certain moment, Van Schappen, a tool manufacturer with production and distribution centres in the Benelux, receives many complaints from both customers and production centres. Most of the complaints concern the P1 hammer, one of their success numbers. The customers are very dissatisfied with the delivery times. The hammers are rarely delivered at the agreed time, and the delay varies from a few weeks to even several months...

The production centres complain mainly about the unpredictability of the production orders. Planned production often has to be postponed because of urgent orders for the 'P1', so that the production department can no longer keep to the original planning, and feel that they have been overtaken by events.

In addition to these complaints, Van Schappen had itself also identified a number of problems: the 'P1' inventory level often too low, extra costs because of urgent orders, and, on the 2010 balance sheet, an undesirable high value of remaining inventory. Van Schappen decided to use Demand Pulse (DP) to deal with these problem areas.

Present situation

During the implementation of Demand Pulse it quickly became clear that Van Schappen's estimates of the demand for their products were inaccurate. These forecasts were made on the basis of the rolling average sales figures over the past months:

- The average sales figures for three weeks.

- This was repeated three times so that there were three averages.

- The average of these three was used to determine the three-weekly rolling average of the last weeks of 2009.

- This three-weekly rolling average value was used to predict the first week of 2010.
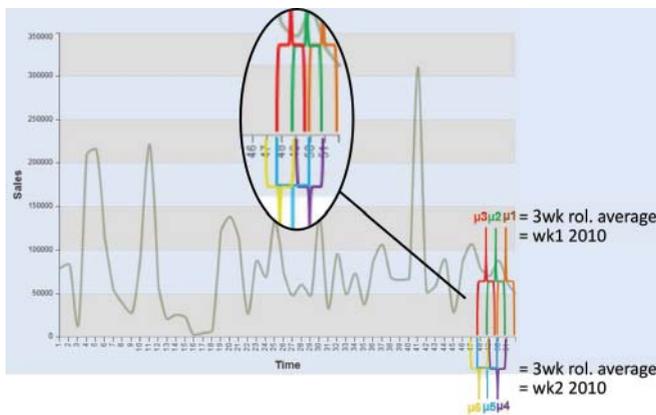
These calculations were performed twice a year, and then, based on them, the whole production plan for the coming six months was set out. The problem with this method lay above all in the inaccuracy of the sales forecasts.

We made an analysis of Van Schappen's forecasting method by comparing the forecast for 2010 with the actual sales figures for 2010. It turned out that their method worked reasonably accurately only for the first few weeks, with an error percentage of 6%. But the longer the forecasting period, the greater the margin of error: no less than 24% at the end of the period!

| FORECAST ERROR RATES	Looking back	3WKS-ROLLING BACKWARD	
		AVERAGE ERROR-RATE	RANGE ERROR RATE
Looking ahead CUM-WEEKS PLANNING HORIZON	1-WEEK	-6%	137 Pts
	2-WEEKS	-6%	91 Pts
	3-WEEKS	-5%	74 Pts
	6-WEEKS	-5%	75 Pts
	12-WEEKS	-8%	76 Pts
	24-WEEKS	-24%	75 Pts

In view of this conclusion, Van Schappen began to wonder if such forecasting was of any use. Our analysis showed that this undoubtedly had added value if it was done on a broader scale, such as for a product group. Because of the lower variation in this case, there was an enormous reduction in the error margin.

Therefore Van Schappen would be able to use this method of forecasting for the planning of manpower, capacity, and long-term contracts for raw materials.

FORECAST ERROR RATES	Looking back	3WKS-ROLLING BACKWARD		12WKS-ROLLING BACKWARD		36WKS-ROLLING BACKWARD	
		AVERAGE ERROR-RATE	RANGE ERROR RATE	AVERAGE ERROR RATE	RANGE ERROR RATE	AVERAGE ERROR RATE	RANGE ERROR RATE
Looking ahead CUM-WEEKS PLANNING HORIZON	1-WEEK	-6%	137 Pts	4%	125 Pts	1%	120 Pts
	2-WEEKS	-6%	91 Pts	5%	81 Pts	2%	83 Pts
	3-WEEKS	-5%	74 Pts	5%	68 Pts	2%	62 Pts
	6-WEEKS	-5%	75 Pts	4%	57 Pts	2%	57 Pts
	12-WEEKS	-8%	76 Pts	1%	56 Pts	1%	46 Pts
	24-WEEKS	-24%	75 Pts	-11%	48 Pts	-4%	25 Pts

But to be able to give better direction to the production team, and to make production more stable, more specific forecasts are necessary. In fact, the production department needs to know every day what quantity of a particular product must be made.

Although it is reasonably easy to estimate how many hammers will be sold on average in six months, it is very difficult to do that for an exact date. The sales pattern of a specific Stock Keeping Unit (SKU) can vary widely, as shown by the graph on the next page for the P1 hammer. All this shows is that, for example, for 95% of the time, between 0 and 45,000 units will be sold on a particular date. The smaller the range of the number of units, the less certain the forecast.
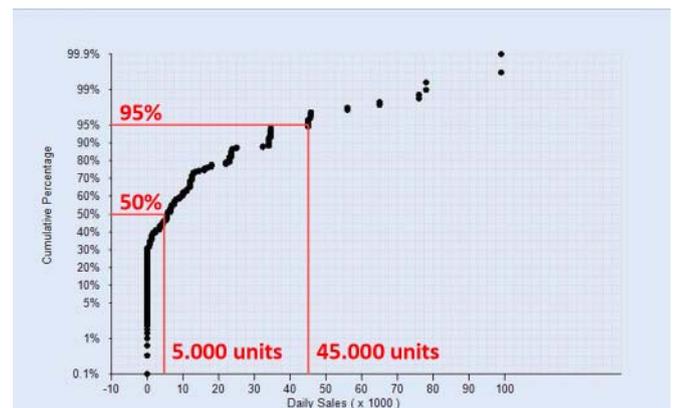
DEMAND PULSE APPROACH

Van Schappen made use of Demand Pulse in precisely this area. To start with, the P1 hammer was taken as an example. The historical sales data for 2010 were entered into the Demand Pulse tool so that the sales pattern could be established, and on the basis of this the correct replenishment parameters could be calculated.

Before Van Schappen started working with these new parameters, a simulation analysis was first made for 'P1' as if these parameters had already been applied in 2010. On the basis of the inventory level of 'P1' on 1 Januari 2010 and the actual daily sales in 2010, the Demand Pulse tool calculated how the P1 inventory could have developed in 2010. This shows that the production and replenishment process would have been much more stable if the Demand Pulse parameters had already been used in 2010 to determine the time and size of production orders for 'P1'.
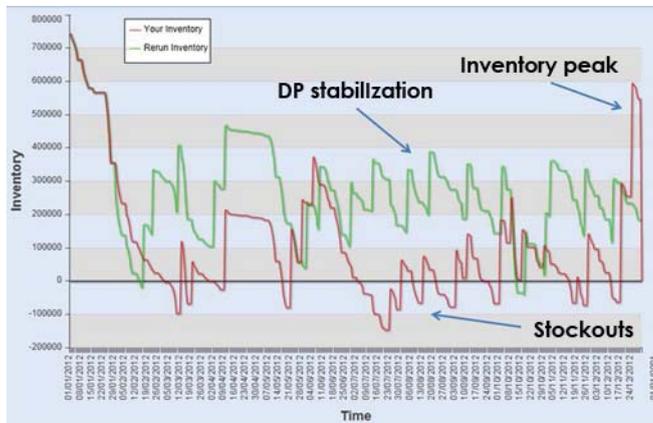
In reality, in 2010, 'P1' was subject to many inventory shortages or stockouts (where the red graph falls below the zero line in the diagram above) that – due to the great pressure on the production department - ultimately led to an enormous inventory level at the end of 2010.

If Van Schappen had calculated the parameters using Demand Pulse in 2010, then 'P1' would have reached a stabilisation point halfway through the year with hardly any stockouts and far fewer inventory fluctuations. Even with less inventory…

With Demand Pulse:

- There would have been **an average inventory of 464,000 units** of 'P1' over the whole of 2010, with a standard deviation of 145, 000 units.
- This inventory would have stabilised in the second half of 2010 with **an average of 211, 000 units** and a **standard deviation of 88, 000 units**.

In reality:

- There was **an average 'P1' inventory of 650, 000 units** over the whole of 2010, with a standard deviation of 186,000 units.
- In the second half of 2010 there was **an average of 391, 000 units** of 'P1' with **a standard deviation of 186,807 units**.

Van Schappen was very pleased with these figures, and decided to have all products analysed by the Demand Pulse tool immediately, so as to achieve greater improvements in 2011.
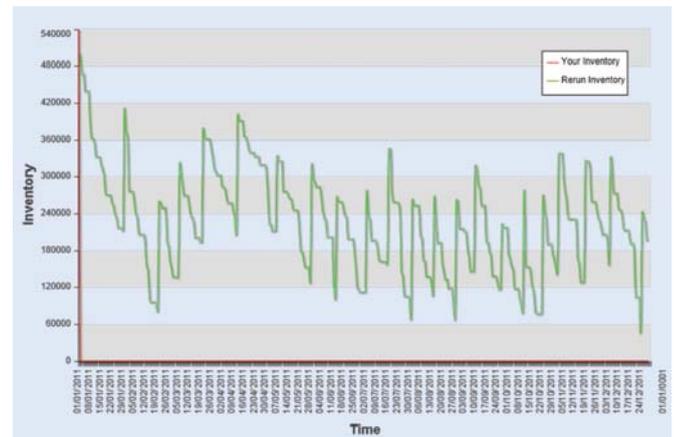
Results

Due to the improved insight into the sales patterns of their products and the correct replenishment levels, Van Schappen no longer produces large quantities of products for which there is weak demand, or insufficent quantities of products for which there is a large demand. In this way, Van Schappen has resolved both a large proportion of the internal problems and of the external problems such as complaints from customers.

Another great advantage is the drastic reduction in the costs associated with superfluous inventory, such as costs of storage space, insurance, and extra staff. The overall cost reduction of 30% has meant that Van Schappen can focus on new projects and other innovative developments.

Conclusion

Demand Pulse solves, for all Stock Keeping Units (SKUs), the inventory control problems caused by unreliable forecasting. By following the sales of individual products very closely, Demand Pulse can indicate which products must be ordered or produced, when, and in what quantities. This prevents excessive inventory of products that are not needed and shortages of products for which the there is a great demand.

This ensures:

- Satisfied internal and external customers
- Considerable cost savings
- Improved reputation of your company

Not to mention the satisfaction of the staff in the warehouse and on the work floor.

If you are interested to learn what Demand Pulse can mean for your inventory control, please contact us.