Prévost Parts

increases replacement part availability and reduces inventory through improved demand forecasting

Parts availability is key to supply chain management for a company like Prevost Parts, which distributes replacement parts for the North American motorcoach and transit bus market. Effective use of demand forecasting and planning software has given them a 25% increase in forecast accuracy compared to that of their former tools. At the same time, they have increased service levels and reduced on-hand inventory.

By Alexandre Daudelin

Prevost Car, Inc. is a leading North American manufacturer of inter-city buses and a world leader in the design and manufacture of coach shells for high-end motorhome and specialty conversion. Prevost Parts, a division of Prevost Car, distributes original coach and urban bus parts. Prevost Parts serves the entire North American market and is the exclusive distributor of certified parts and components of Prevost Car and Nova Bus. It also offers replacement parts for other models.

Prevost Parts complies with the highest quality standards and is organized to maintain the highest satisfaction rate in the industry. Its parts distribution network assures a presence in every strategic location in North America, now including six distribution centers in the United States and one in Canada.

Network survey

In 2001, Prevost Parts had just completed a very comprehensive, divison-wide SAP implementation and was ready to move to the next stage. "We must continue to lead the way in customer services while reducing operating costs," said Gilles Dion, Vice President of Prevost Car's Parts and Services operations and also of its American division.

Prevost Parts conducted a network survey, assisted by management consultants Robert Lamarre & Associates and Kom International. The survey revealed major opportunities for

network optimization and improvement of storage policies and certain business practices.

It showed that more than 25% of customer deliveries were made from distribution centers other than the one closest to the customer. Some deliveries resulted from customers contacting the wrong distribution center out of habit or choice, while others were due to the unavailability of parts.

Prevost Parts managed its stock with a SAP Min/Max system. "Our Min/Max system does not take seasonal demand patterns into account. It is too high in the off season and too low when needs are the greatest. Also, there are highs and lows in demand that are totally unrelated to the season," said statistician Jean-François Lord. The solution was either to ensure tight monitoring or make manual adjustments as needed—a gigantic task with over 25,000 active parts in the network.

One of the problems was due to SAP's consumption file. This file contained the demand history data SAP used to manage inventory parameters and feed the sales forecasting module. The following corrections had to be made to the data:

1- Indicate the demand and lead time at the warehouse that should have made the delivery to the client rather than the one that did make the delivery;
2- Revise the demand history to reflect better the change in network structure;
3- Add flexibility to properly take into account discontinued parts and lost customers or contracts;
4- Maintain appropriate demand history, as new parts are introduced replacing corresponding older parts.

ABC classification

Once Prevost Parts had adjusted the demand history, it could proceed with ABC classification of its parts inventory and set storage policies. For example, critical parts were identified and assigned high service level stocking requirements.

Parts that could put a vehicle out of service were coded as critical. Others that are needed to satisfy only occasional servicing needs were given a specific code because they are sold just once every two or three years. Finally, other parts were designated for storage in one central warehouse rather than in all the distribution centers.

New parts (history of less than a year) were assigned to a specific class and other parts were classified A-B-C-D according to demand frequency rather than unit value, as is the case in most systems. Customer service and inventory level goals were then set for each class.

Choice of a demand forecasting and planning system

Prevost Parts was aware of the limitations of its SAP Min/Max tool: it is not versatile enough and it cannot take advantage of all the regular functions of an MRP system.

At the same time, Dave Gilbert, inventory control director at Prevost, was also aware of the limitations of SAP's sales forecasting formulas: the formulas work correctly for "normal", standard demand data. However, 70% of Prevost Parts' replacement parts have an intermittent, irregular demand profile, and the standard formulas do not provide reliable results for these types of items.

The search was on to find the tool best adapted to the inventory management needs of Prevost Parts. These were the steps in the evaluation process:

7 steps

1- Identify the business and functional capabilities required of a demand forecasting and planning system.
2- Assign weights to system features (1= Nice to have; 2= Important; 3+= Required) and an evaluation scale, in this case from 1 to 5. A feature with a weight of 3 and a maximum rating would receive 15 points.
3- Select a representative product sampling to test forecast results.
4- Contact forecasting software suppliers and ask each of them to present their software system and generate a three-month sales forecast.
5- For each system, assess the software's capabilities to properly estimate required safety stock levels.
6- For each system, evaluate the costs associated with the software's acquisition and implementation, as well as its expected benefits.
7- Make a final choice from among competing software systems.

What factors were important for Prevost Parts in choosing its forecasting and planning system?

1. Intermittent demand forecasting capability: Roughly 70% of the parts distributed by Prevost Parts have an intermittent demand profile. This was a crucial point for Prevost Parts.
2. Visibility in the MRP system: Prevost Parts knew of the limitations of Min/Max and was determined to use the full potential of SAP's MRP module. The forecasting program had to be able to generate forecasts for every product, including safety stock, to ensure efficient operations. This would simplify the interface with SAP's MRP module. A hybrid system generating sales forecasts for a product in some centers and Min/Max systems for the same parts in other centers was a management nightmare. It was practically impossible to furnish distribution centers with the necessary volumes of safety stock to ensure desired service levels for the whole network. The lack of parts visibility in Min/Max undermines MRP performance. Either another form of Min/Max or additional safety stock was needed in each distribution center to compensate for this lack of visibility. But it was still necessary to determine how to calculate the correct amount of safety stock, which could be expected to change over time.

3. Forecast error calculation: The majority of systems calculate forecast error in terms of a quantity measure, such as mean absolute deviation (MAD), and/or a percentage measure, such as mean absolute percentage error (MAPE). Error is normally calculated for only one month ahead, but some systems offer the flexibility of cumulative lead time accuracy measurements. For example, in the case of a product with a three-month lead time, forecast error/accuracy should be measured three months ahead over the entire lead time.
4. Safety stock calculation: Safety stock is calculated based on forecast accuracy, desired service level and procurement lead time. In a multi-warehouse environment, the calculation of safety stock for a central warehouse is different than that for a satellite warehouse. It must compensate for forecasting deviations across the whole network being supplied, not just for local sales. Also, to ensure accuracy in the case of intermittently demanded items, the safety stock calculations should reflect an empirical demand distribution based on actual data, rather than an assumed "normal", bell-shaped distribution.

In addition to these four key capabilities, Prevost Parts evaluated the software's capacity to identify and isolate extreme values when needed; ability to recognize different types of seasonal patterns; capacity for bottom-up and top-down product group forecasting; flexibility to introduce budgetary data; graphic capacity; system speed; and flexibility to communicate and exchange information throughout the organization to facilitate a collaborative forecasting process.

Summary of the software evaluation based on system capabilities

Six applications were evaluated, including SAP. SmartForecasts™, from Smart Software, Inc. of Belmont, Massachusetts, turned out to be the application with the highest rating in terms of the required capabilities. SmartForecasts includes a patented intermittent demand forecasting solution.

The key factor was SmartForecasts' capacity to generate accurate sales and safety stock forecasts for intermittently demanded products within SAP's MRP system. This application simplifies the process of maintaining safety stock and interfacing with SAP. Other applications offered simple and ingenious solutions, but these were for Min/Max systems and they had limitations. They also offered other interesting capabilities, but these were less relevant to the needs of Prevost Parts.

Table 1 : Évaluation of the applications' functional capabilities

		Smart	App 2	App 3	App 4	App 5	App 6
Total score		125	59	81	64	98	51

6 applications

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Evaluation of the applications' accuracy

SmartForecasts was the most accurate of the six software applications tested. Generally speaking, all of the applications rely on the concepts of MAD and MAPE to calculate forecast error.

Another critical measure was added: the dollar value of safety stock levels. The goal of forecasting is to get optimal results, in other words, to minimize inventory and safety stock levels (and their associated dollar costs) in order to meet desired customer service levels.

SmartForecasts also came in first in terms of reducing required levels of safety stock. It was 18.7% better than the next best application.

In practical terms, better forecasting would allow Prevost Parts to increase customer service levels to 96%, while decreasing total inventory by 15% to 20% and reducing emergency transportation costs. For all these reasons, Gilles Dion, Prevost's Vice President of Parts and Services and now CEO of Nova Bus, approved the purchase and implementation of SmartForecasts.

Smart Software, together with its Canadian distributor IMAFS, Inc., provided training and facilitated the integration of SmartForecasts into the SAP system used by Prevost Parts. "Training and integration were smoother and more efficient than we had expected," affirmed Dave Gilbert.

In conclusion

The choice of demand forecasting and planning software should not be made in isolation; it should be part of an overall supply chain integration strategy. Network optimization, storage policies, sales history updating and database restructuring are prerequisites for implementing demand forecasting and planning software. SmartForecasts was the application that gave the most accurate forecasts and was most able to meet the needs of Prevost Parts. ❑

What can SmartForecasts do?

SmartForecasts is a modern demand forecasting, planning and inventory optimization software system that can manage large databases and automatically generate accurate forecasts for many thousands of items in mere minutes. Some of its key features include:

- Automatic statistical forecasting of thousands of sales and inventory items, incorporating trends and seasonal patterns
- Inventory planning tools to estimate stocking levels and safety stock requirements for all forecasted items
- Top-down/bottom-up multilevel forecasting of product groups
- Unique, patented technology for intermittent demand forecasting
- "Cause-and-Effect" forecasts using multivariate regression (for example, forecast future sales based on selling price)
- Promotion/event models to forecast promotion-driven sales
- Interactive judgmental adjustments of forecast results
- Fully integrated comments facility to attach notes and document changes to any forecasted item
- Collaborative forecasting capabilities to save multiple forecast scenarios for any item and facilitate consensus planning
- OLAP data management capabilities with flexible "slicing and dicing" of multidimensional data
- "Forecasts vs Actuals" reporting module to help track forecast accuracy
- Direct integration with major corporate databases, such as Oracle, IBM DB2, SQL Server and MS Access, as well as most SCM and ERP planning systems.

For more information about SmartForecasts, please contact Smart Software, Inc. at 1-800-SMART-99 (1-800-762-7899) or email to: sales@smartcorp.com . Smart Software can be found on the World Wide Web at www.smartcorp.com .