Forecasting in Supply Chain

by Jim Cantrell, jim@amosoft.com

Statistical Forecasting
In supply chain management software, the forecast is a calculation that is fed data from real time transactions and is based on a set of variables that are configured for a number of statistical forecast situations. Planning professionals are required to use the software to provide the best forecast situation possible and often this is left unchecked without any review for long periods. To best use the forecasting techniques in the supply chain software, planners should review their decisions with respect to the internal and external environment. They should adjust the calculation to provide a more accurate forecast based on the current information they have.

Statistical forecasts are best estimates of what will occur in the future based on the demand that has occurred in the past. Historical demand data can be used to produce a forecast using simple linear regression. This gives equal weighting to the demand of the historical periods and projects the demand into the future. However, forecasts today give greater emphasis on the more recent demand data than the older data. This is called smoothing and is produced by giving more weight to the recent data. Exponential smoothing refers to ever-greater weighting given to the more recent historical periods. Therefore a period two months ago has a greater weighting than a period six months ago. The weighting is called the Alpha Factor and the higher the weighting, or Alpha factor the fewer historical periods are used to create the forecast. For example, a high Alpha factor gives high weighting to recent periods and demand from periods for a year or two years ago are weighted so lightly that they have no bearing on the overall forecast. A low Alpha factor means historical data is more relevant to the forecast.

Historical periods generally contain demand data from a fixed month, i.e. June or July. However, this introduces error into the calculation as some months have more days than other months and the number of workdays can vary. Some companies use daily demand to alleviate this error, although if the forecaster understands the error, monthly historical periods can be used along with a tracking indicator to identify when the forecast deviates significantly from the actual demand. The level at which the tracking signal flags the deviation is determined by the forecaster or software and vary between industries, companies and products. A small deviation may require intervention when the product being forecasted is high-value, whereas a low-value item may not require the forecast be scrutinized to such a high level.

Non-Statistical Forecasting
Non-statistical forecasting is found in supply chain management software where demand is forecasted based on quantities determined by the production planners. This

occurs when the planner enters in a subjective quantity that they believe the demand will be without any reference to historical demand. The other non-statistical forecasting that occurs is when demand for an item is based on the results of materials requirements planning (MRP) runs. This takes the demand for the finished good and explodes the bill of materials so that a demand is calculated for the component parts. The component demand can then be amended by the planner based on their assessment and knowledge of the current environment. The resulting forecast is based on current demand and will not incorporate any demand from previous periods. Many companies will use a combination of non-statistical and statistical forecasting across their product line.

Statistical forecasting is based on complex calculations and the future demand can be determined based on the demand from historical periods. The forecast gives the planner a guide to future demand, but no forecast is totally accurate and the planners experience and knowledge of the current and future environment is important in determining the future demand for a company's products.