**Operations and Supply Chain Management**

**Chapter 2 Planning and Control Systems**

Factors that affect SCO activities within an organization:

1. **Executive Sales and Operating Plan** – a roadmap for the organization that is agreed upon cross-functionally that balances supply / demand issues and links operational decisions back to financial goals and targets. It provides a path for SCO to implement its various functions.
2. **Lead Time** – the total time from when an order is placed to when the product reaches the end-customer. The clock starts when the order is placed and processed, materials and ordered and received, production, and distribution. Other factors that affect lead time include product complexity, order placement (platform), and contractual arrangements between company and customer.
3. **Safety Stock** – excess inventory that is kept on-hand when supply and demand go out of balance. Other factors that drive stock levels include defective product runs, lost shipments, acceptance of late orders outside of normal ordering windows, etc. Statistics, experience, and seasonality are important when optimizing stock levels.
4. Service Level – usually agreed upon between company and customer and is dictated by the number of units ordered that could be filled using inventory on hand.

**Master Scheduling**

**Planning** ensures that the correct amount of raw materials, personnel, and other resources are “scheduled” in order to create the necessary number of products. This plan is integrated into a master schedule that drives when and where resources will be required. Formally, the master schedule feeds into the Material, Production, and Inventory Plans. The very first step in setting the master schedule is generating a forecast.

**Forecasts** can be quantitative and/or qualitative and rely on diverse sources of information ranging from historical performance, market research, expert opinions, regression analysis, customer surveys, and time series methods. Forecasting can help reduce uncertainty around not knowing exact demand given the required lead time and service levels. As lead times get longer, supply and demand forecasting become more uncertain because customers are themselves more unsure about long-horizon market demand with supply-side variability adding more complexity to forecasting. Seasonality also plays a role.

**Master Schedule** There are three components to a master schedule: 1) **material resource plan**, 2) **enterprise resource plan**, and 3) **inventory plan**. The demand-plan and supply-plan, as discussed in the “Forecasts” section serve as constraints to the master schedule. Once the **demand-plan** is formulated, the **supply-plan** considers the safety stock levels relative to the demand plan in order to generate a **master schedule**.

Before looking at each of these sub-components in detail, lets first examine key business parameters:

* CTC has 80 manufacturing employees
* At any given time, there is a minimum of 30 employees working
* Employees work an 8-hour shift
* CTC manufactures 25 scissors per hour using 5 manufacturing lines each with a throughput of one scissor manufactured every 12 minutes.

**Demand** The forecasted demand can be formulated by customer by product by month. The individual customer demand by product can be totaled to arrive at the total monthly product demand.

**Supply** The required manufacturing output equal the total monthly product demand netted against on-hand inventory with an add-back for safety stock. This simple calculation assumes that the distribution network can deliver the demand irrespective of the proximity of the end-customer, however, this assumption doesn’t hold for complex and dispersed distribution networks.

**Required Manufacturing Output =** Demand – On-hand inventory + Safety stock

If a company runs manufacturing exactly as prescribed above, next month’s on-hand inventory will be offset entirely by the safety-stock and the monthly required manufacturing output will always equal to monthly demand. However, this may not be the way to drive manufacturing output in real-world scenarios due to several complicating factors:

xact production schedule. However, it may be more economical to general surplus supply and retain a larger excess inventory after factoring inventory holding costs.