Managing Customer Responsiveness
at Littlefield Technologies

Background

Littlefield Technologies (LT) has developed another DSS product. The new product is manufactured using the same process as the product in the assignment "Capacity Management at Littlefield Technologies" — neither the process sequence nor the process time distributions at each tool have changed. On day 0, the factory began operations with three stuffers, one tester, and one tuner, and a raw materials inventory of 9600 kits. This left the factory with $1,000,000 in reserves. Customer demand continues to be random, but the long-run average demand will not change over the product's 268-day lifetime. At the end of this lifetime, demand will end abruptly and factory operations will be terminated. At this point, all capacity and remaining inventory will be useless, and thus have no value.

Management would like to charge the higher prices that customers would pay for dramatically shorter lead times. However, historic lead times often extend into several days, so management has been unwilling to quote the shorter lead times.

Operations Policies at Littlefield

LT uses a Reorder Point / Order Quantity raw material purchase policy. That is, raw kits are purchased as soon as the following three criteria are all met: (1) the inventory of raw kits is less than the reorder point, (2) there are no orders for raw kits currently outstanding, and (3) the factory has sufficient cash to purchase the reorder quantity. No order is placed if any of these three criteria are not met. So, for example, a team could prevent orders from being placed at all by setting the order quantity so high that there is insufficient cash to place an order.

Kits are purchased in multiples of 60 because orders arrive in batches of 60. A reliable supplier delivers exactly the order quantity of batches, four days after the order is placed and paid for. Management considers physical cost of holding inventory negligible compared to the financial costs. Other details concerning the purchasing policy can be found in the "Littlefield Technologies — Overview" note. The current reorder point and reorder quantity can be changed by clicking on "Edit Data" on the Materials Buffer icon.

Customers are willing to pay a premium for fast lead times, and you now have three pricing contracts to choose from:

- price = $750; quoted lead time = 7 days; maximum lead time = 14 days. (This is the contract that the factory starts with).
- price = $1000; quoted lead time = 1 day; maximum lead time = 3 days.
- price = $1250; quoted lead time = 0.5 days; maximum lead time = 1 day.

As before, if an order's lead time exceeds the quoted lead time, then the revenue for that order decreases linearly, from the prices above for the quoted lead time to $0 for the maximum lead time. A contract is assigned to an order as soon as it arrives at the factory, and that contract cannot be changed subsequently for that order. Contracts for future orders can be selected by clicking on "Edit Data" on the Customer Order icon.

You will also notice a few days where zero jobs are completed by the factory. On such days, the daily average lead time and daily average revenues are meaningless, so a value of zero will appear in the plots and downloaded data on those days.

You are also allowed to buy and sell machines and change the scheduling rule at the tester.

Assignment

The factory has been running for 50 simulated days, and management has recalled the high-powered operations team (you) to manage the capacity, scheduling, purchasing, lot sizing, and contract quotations to maximize the cash generated by the factory over its lifetime. Management is not providing any operating budget beyond the cash generated by the factory itself. You will have control of the factory from day 50 to day 218. At 1 hour per simulated day, this translates to 7 real days. At day 218, you lose control of the factory, and the simulation will quickly run another 50 days of simulation. When you lose control of the factory, management expects you to leave the factory parameters set to maximize the factory's cash position when the factory shuts down on day 268. After the simulation ends on day 268, you can check the status of your factory, but the factory will no longer be running.