

The Simple Company (TSC)

The TSC and TSC-MRP scenarios

This case study describes the story of the TSC, TSCMRP, TSCs and TSCMs scenarios.

(For more details please go over the information available at the Management Boardroom tab, the links on the room's wall). All TSC scenarios have only two products, four machines, and three raw materials. Some of the TSC scenarios have a special tab named 'Cockpit' under the Management department tab, providing a dynamic, online analytical cockpit presentation of the organization's performance status along its internal supply chain. The cockpit analyzes each department's constraints, translates them into a product's unit measures and presents the organizational overall bottleneck.

Marketing Data

Product A1:

- ☐ Price: \$200.00
- ☐ Material cost: \$110
- ☐ Full product cost: \$190
- ☐ Average units sold in a month: 117
- ☐ Quoted Lead Time (QLT): 15 days
- ☐ Shelf life: 30 calendar days

Product C1:

- ☐ Price: \$500.00
- ☐ Material cost: \$310
- ☐ Full product cost: \$403
- ☐ Average units sold in a month: 107
- ☐ Quoted Lead Time (QLT): 15 days
- ☐ Shelf life: 30 calendar days

Marketing Policies:

☐ The global logistics policy is a strict 'make-to-order' policy (i.e., only units ordered by customers are produced). There is no safety net of product stocks.

☐ **Price** and **QLT** (the time commitment to deliver) are the two main marketing parameters:

☐ **QLT:** One obvious factor is the customer's desire for a quick response. If you think you can supply any customer order in less than 15 days, then you should change the marketing policy that sets the current QLT to whatever you think is realistic. You will find more customers, for example, if you state you're committed to deliver in 10 days. Be certain that you can really meet due dates, otherwise your customers will be critical of your due-date performance; this will earn your company a bad reputation, which may adversely affect your customers' future decisions about buying your product.

☐ **Price:** Another obvious factor is the price of your products. This is a 'normal' market, meaning the higher the price the lower the demand and vice versa.

Production Data

Four machines:

- ☐ GT – Setup time: 60 minutes
- ☐ M1 – Setup time: 120 minutes
- ☐ M2 – Setup time: 10 minutes
- ☐ PK – Setup time: 20 minutes

The production routing (see flow diagram in booklet from first semester):

The company produces two products: A1 and C1. The flow is from left to right. To produce one unit of A1, you have to start with two units of material: one unit of Z1 and one unit of Y1. These materials go to the GT machine, for which the operation ID is J4. GT processes a unit in 19 minutes time-per-part (TPP), not including setup. The unit then goes to the M1 machine (operation J3) for 18 minutes, M2 (operation J2) for 9 minutes, and PK (operation J1) for 19 minutes on average. To produce one unit of C1, one unit of material Y1 and one unit of Z3 are needed. The materials go to the GT machine first (operation J8), for 7 minutes, then to M1 (operation J7) for 8 minutes, M2 (operation J6) for 50 minutes and PK (operation J5) for 10 minutes.

Production Policies (Not applicable to TSCMs and TSCs scenarios):

- ☐ Work orders planning: The frequency of generating the work orders, based on incoming orders.
- ☐ Batching policy: The minimum batch quantity in a WO. In every planning session, new WOs are created according to the accumulated new market demand that was registered. The extra parts will be automatically allocated to additional market demand without creating unnecessary WOs.
- ☐ Dispatch policy: The sequence in which the machine operators load their work orders.
- ☐ WO acceptance: Authorization for machine operators to start working on complete or incomplete batches of work orders.
- ☐ You also have enough flexibility to instruct a machine operator to switch to any WO at any time.

For reducing complexity, the TSCMs and TSCs scenarios have no available production policies to control. However, they do have new 'Action': Enabling extra shifts. This 'Action' allows doubling the production capacity (Note: it also doubles the fixed operational expenses).

Purchasing Data

Materials:

☐ **Z1**

- o Needed for A1:
- o The price of one unit from the cheapest supplier: \$100
- o The price of one unit from the expensive supplier: \$110
- o Shelf life: 45 calendar days

☐ **Z3**

- o Needed for C1:
- o The price of one unit from the cheapest supplier: \$300
- o The price of one unit from the expensive supplier: \$330
- o Shelf life: 45 calendar days

☐ **Y1**

- o Needed for A1 and C1:
- o The price of one unit from the cheapest supplier: \$10
- o The price of one unit from the expensive supplier: \$12
- o Shelf life: 45 calendar days

Suppliers:

☐ **AAA**

- o Cheap and slow
- o QLT to deliver: 20 days (4 weeks)
- o Fixed costs per order: \$100

o **BBB**

- o Expensive and quick.
- o QLT to deliver: Two days
- o Fixed costs per order: \$200

The prices of materials from BBB are 10-20% more expensive (look at the 'Suppliers' option under the 'Actions' menu at the Purchasing View).

Purchasing Policies:

We have 2 purchasing policies, 'Purchase to Stock' and purchasing according to 'Material Requirements Planning' (MRP). The purchasing department uses a different purchasing module in the TSC and TSCs scenarios than in the TSCMRP and TSCMs. The 'MRP' policy estimates the future raw materials consumption based on past marketing demand.

The 'Purchase to Stock' policy requires more managerial attention and understanding of the supply chain, but enables achieving efficiency of raw materials availability.

'Purchase to Stock' Inventory policy

The previous management team for TSC and TSCs has decided to use the Purchase to Stock policy. The order level is the order point. When the stock drops below the order level, an automatic purchasing order is issued to the default supplier to complement the stock to the maximum level. The main inventory policy is (s, S) – that is 're-order point, order level.' It means that when the inventory level drops below the re-order point (s), an order is placed for (S-It), where It is inventory level at t. The actual order quantity (how much to order) is the difference between what we want to (or should) have, and what we currently have.

The default supplier for the inventory policy is AAA.

This is the current inventory policy:

For example: If the stock level (on hand + on order) of Z1 drops to 92 (below 120), a purchase order is automatically generated for 408 units (500-92).

Inventory alert

The inventory alert mechanism comes to alert you when the on hand drops below the alert level. This mechanism is separated from the inventory policy and does not generate orders from the suppliers. Currently the red line level of all materials is 50 units. If the on hand stock of Z1 drops to 45 you will be alerted.

'MRP' Inventory policy

The previous management team for TSCMRP and TSCMs has decided to use the MRP policy. The MRP pulls together all the requirements for an individual product from all demand sources and calculates a recommended replenishment plan that meets all your requirements.

In MRP, you rely on a weekly MRP run (every Monday) that adds forecast to the current active work orders. Based on the active work orders as well as the forecast, the module prepares an MRP list. This is a six-month month projection of materials required, their quantities and the need-by dates for production. The module goes over this list, checking if the total requirements for a certain defined supplier's lead time period are over the 'on-hand quantity'. If so, the module issues a purchasing order for the missing quantity. This defined lead time is set by the Purchasing, and the simplest approach is to order according to the supplier's Quoted Lead Time (QLT). A more careful approach is to order some days in advance, ascertaining that it will arrive on time, but the cost is having high inventory value.

Another factor of this policy may be to specify a minimum amount per order. When an automatic order is issued on the missing material quantity, it cannot be below this minimum level.

Some scenarios do not have the 'Purchasing Policy' available. The example below shows the initial parameters of the 'Purchasing Policy' in these scenarios. Scenarios with the 'Purchasing Policy' available might have different initial parameters that can be changed at any time.

The current inventory policy:

For example: The supplier's QLT is 20 days. The MRP module goes over the MRP list and sums up the total requirements for the next 20 days. If the requirement for Z1 is 200 and the stock level (on hand + on order) of Z1 is 150 (missing 50 units), an automatic purchase order is generated. Because the minimum quantity to order is 100, the order will be for 100 units and not for 50 units.

These are the current additional parameters for the MRP inventory policy: Safety stock: Usually, the MRP policy orders what you need according to the MRP forecast. You may decide, due to some urgent market opportunities, to keep unassigned stock as a safety measure. The MRP module will not include this quantity in the current stock.

Red-line time: MRP accurately specifies the material needs. However, it does not know whether the materials will arrive on time. The red-line time warns you that material is due within a few days and is not yet available.

Under the MRP module, the entry in the Information menu of the Purchasing View, the inventory levels are defined: The RM weekly balance is a weekly updated report that presents an overall status of the materials' MRP.

This report displays the future material status along the timeframe according to the MRP policy planning lead time, including the materials' requirements, on hand as well as on order quantities. This report displays the future material information at weekly intervals.

Assignment

Your charge is to maximize the amount of profit by improving marketing, purchasing and production efficiency while keeping **the company's reputation to a minimum of 85% at the end of the first year run** (or to be defined by the course professor) and having a positive cash balance.