VNIVERSITAT DE VALÈNCIA

Facultat d'Economia

DEGREE IN ADMINISTRATION AND BUSINESS MANAGEMENT

35836 Operations Management: Decisions and Resources (OR/English Group)

Practical Exercises - Chapter 7 - Stock Management with Independent Demand

201819

CHAPTER 7. INVENTORY MANAGEMENT WITH INDEPENDENT DEMAND

EXERCISE 7.1 A metal working company needs to buy plastic inserts to be used in production. The following information is available:

Acquisition cost: €12.5 euro/piece
Daily consumption: 178 pieces
Purchase order emission cost: €500 euro/order
Holding cost: €1.25 euro/piece/year
Supplier's lead time: 7 days
Management study scope: 1 year (360 working days)

Please calculate: optimal order quantity; nº of orders per year; reorder point; and total cost per year.

EXERCISE 7.2.

Calculate the optimal order size and the reorder point in the fixed order quantity model using the following data:

Annual demand: 1000 units
Purchase order emission cost: €5/order
Holding cost: €1 /unit/year
Supplier's lead time: 15 days
40 days
Management study scope: 1 year (250 working days)

EXERCISE 7.3.

A company assembles a product in which one of its components is used at a rate of 40 units/day and produced in a section of the works at a rate of 100 units/day. Purchase order set up cost is €50 and holding cost is €0.5 /unit/year.

Calculate the optimal purchase order quantity and reorder point, given a supplier lead time of 35 days and assuming your management scope is 10 months (25 working days per month). Consider that the company is using a model of simultaneous production and usage.

EXERCISE 7.4.

The assembly section of a metal fabricator uses 40 units daily of a part that is produced in its works at a rate of 100 parts per day, during the time needed to fill the order placed by the assembly section. So, during time 't1', production and usage are simultaneous.

The issuing and setting up of a replenishment order costs €500, and holding costs are €0.5 /unit/month

Our management scope is 10 months (243 working days) during which a total of 9720 units will be used. Please calculate:

- Optimal lot size
- Time needed for fabrication, and time spent only in usage.
- Reorder point for a lead time of 7, 30, and 50 days.

EXERCISE 7.5

Company AAA externally sources an item that is used in the making of one of its products. It wishes to reduce the inventory management by using fixed quantity orders.

Assuming the management scope is 1000 days and the associated demand is 8000 units, that the optimal order size is 400 units, and that 20 orders are issued during the mentioned period, please calculate:

a) Cycle time
b) Reorder point if the supplier lead time is 25 days.

Another of the components of the final product is manufactured in-house at a rate of 200 units/day, and used in the production process at a rate of 100 units/day. Knowing that the setup cost is €25 per order and the holding cost €0.01 per unit and day (management scope is one year of 360 days), please calculate:

c) EOQ
d) Cycle time with the two sub-periods duration.

EXERCISE 7.6 THIS EXERCISE IS TO BE PRESENTED BY THE TEAM

Company ATE sells disposable syringes to hospitals and health centres and want to reduce the inventory management cost using a basic fixed quantity order model.

Assume the scope time is 500 days, that the demand for this period is 4000 units, and the optimal lot size is 200 units (therefore, 20 orders are emitted during this period). Please calculate:

a) Cycle time
b) Reorder point if the supplier lead time is 15 days.
c) Reorder point if the supplier lead time is 25 days.

Furthermore, the company manufactures and sells hangers for the retail sector. The annual demand (250 working days) is 25,000 units, the company can make them at a rate of 200 units per day, and the average selling rate is 100 units per day. Setup costs for an order are €625, and the holding cost is €0.01 per unit and day. You are asked to determine, considering a management scope of one year:

d) EOQ
e) Cycle time, with both sub-periods identified:
    a. The period in which production and sales coincide
    b. The period during which there is no production, only sales.
f) The maximum stock and average stock

EXERCISE 7.7

An industrial company in Valencia wants to reduce inventory management costs by using the EOQ approach in a fixed quantity order model. Assume the following data:

Scope time: 300 days Daily demand 8 units/day

Holding cost: €1.20/unit ·scope time Purchase order emission cost: €90/order. Please calculate:

a) Economic order quantity
b) Number of orders per scope time and cycle time
c) Reorder point if the supplier has a lead time of 10 days and there is no safety stock
d) Holding and ordering costs per scope time
e) Represent the exercise graphically

Furthermore, the company manufactures and sells a product for the retail sector. The annual demand is 30,000 units, the company can make them at a rate of 180 units per day, and the average selling rate is 120 units per day. Setup costs for an order are €125, and the holding cost is €2.5 per unit and year. You are asked to determine, considering a management scope of one year (250 working days):

f) Optimum lot size.
g) Number of orders and cycle time.
h) Time in which there is simultaneous production and sales, and only sales.
i) Maximum stock and average stock.
j) Reorder point assuming a setup time of 7 days.
k) Represent the exercise graphically.

EXERCISE 7.8

An industrial company in Valencia wants to reduce inventory management cost by using the EOQ approach in a fixed quantity order model.

Assume the following data:

Scope time: 300 days Daily demand 10 units/day

Holding cost: €3.00/unit/scope time Purchase order emission cost: €20/order

Please calculate:

a) Economic order quantity
b) Number of orders per scope time and length of cycle time
c) Reorder point if the supplier has a lead time of 10 days and there is no safety stock
d) Holding and ordering costs per scope time
e) Represent the exercise graphically

Furthermore, it manufactures and sells a product for the retail sector. The annual demand is 12,000 units, the company can make them at a rate of 80 units per day, and the average selling rate is 50 units per day. Setup costs for an order are €112.5, and the holding cost is €1.25 per unit and year. You're asked to determine, considering a management scope of one year (240 working days):

f) Optimum lot size.
g) Number of orders and cycle time.
h) Time in which there is simultaneous production and sales, and only sales.
i) Maximum stock and average stock.
j) Reorder point assuming a setup time of 7 days.
k) Represent the exercise graphically.

EXERCISE 7.9

An industrial company in Valencia wants to reduce inventory management cost by using the EOQ approach in a fixed quantity order model. Each unit of product costs €24 and the company spends €90,000 per year on purchases. Assume a scope time of 375 days, a holding cost of 25% of

purchasing cost/unit/scope time, and a purchase order emission cost of €50/order. Please calculate:

a) Economic order quantity
b) Number of orders per scope time and cycle time
c) Reorder point if the supplier has a lead time of 10 days and there is no safety stock
d) Holding and ordering costs per scope time
e) Represent the exercise graphically

Furthermore, it manufactures and sells a product for the retail sector, whose production cost is €20. The annual demand is 18,000 units, the company can make them at a rate of 100 units per day, and the average selling rate is 60 units per day. Setup costs for an order are €64, and the holding cost is 20% of the cost per unit and year. You're asked to determine, considering a management scope of one year (300 working days):

f) Optimum lot size.
g) Number of orders and cycle time.
h) Time in which there is simultaneous production and sales, and only sales.
i) Maximum stock and average stock.
j) Reorder point assuming a setup time of 7 days, 10 days, and 25 days.
k) Represent the exercise graphically.
l) Ordering and holding costs per scope time.

Deliverables in this paper:

a) A written solution to Exercises 7.1 through 7.9, to be uploaded on Moodle not later than the specified date.

b) A presentation of Exercise 7.6, backed by a PowerPoint presentation, to be shown to the rest of the class on the specified date.