

The Production Game

- *Session 1* -

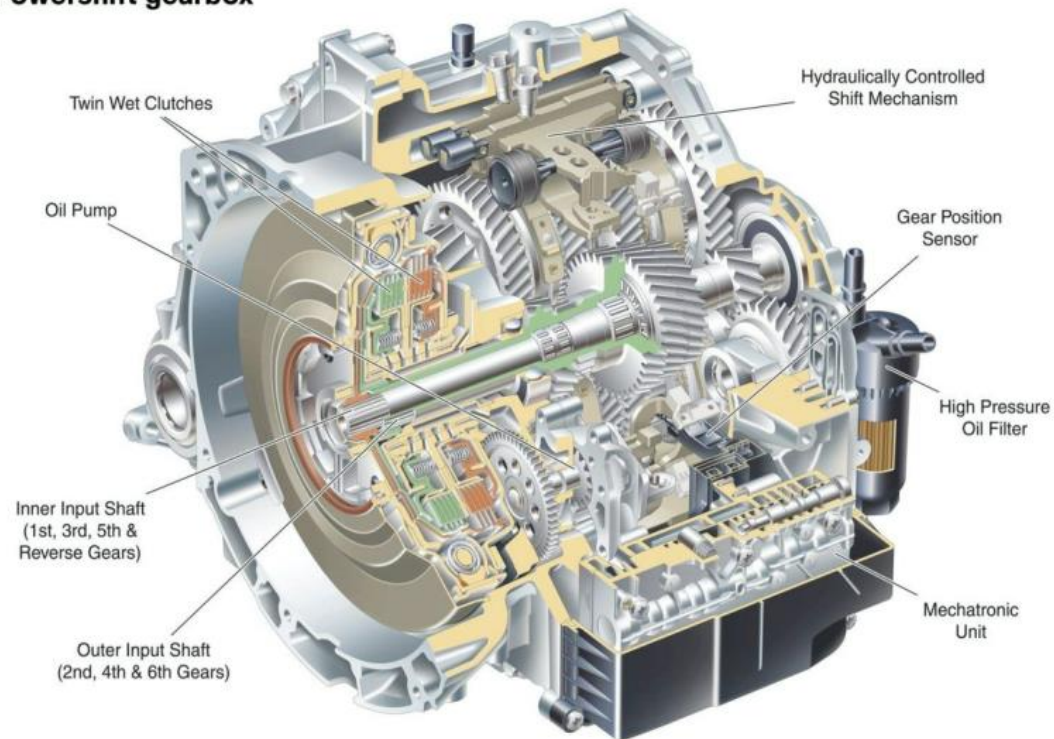
Company

AKAB

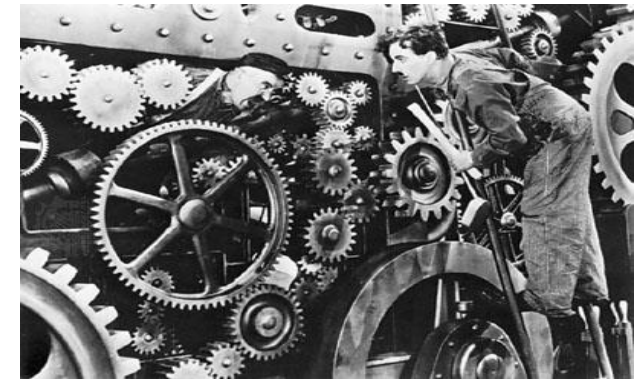
AKAB

The product: Gearboxes

Powershift gearbox

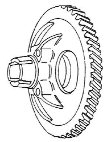


Volvo Car Corporation

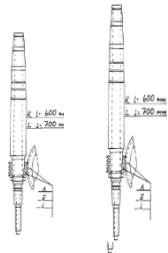


AKAB

Year 0



A

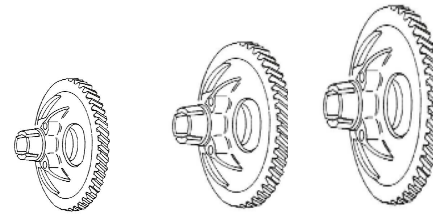


K L

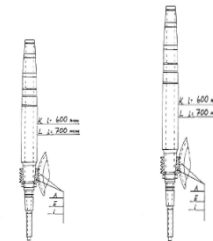
AK-AL

2 variants

Year 1



A E I



K L

AK-AL-EK-EL-IK-IL

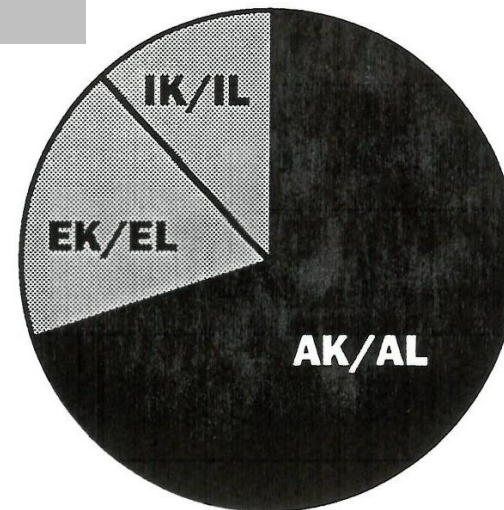
6 variants

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Forecast

Sales forecast (Ger boxes / Year)

AK och AL	3.500/år
EK och EL	900/år
IK och IL	600/år



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Stakeholders

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Give me higher ROI...



Owner

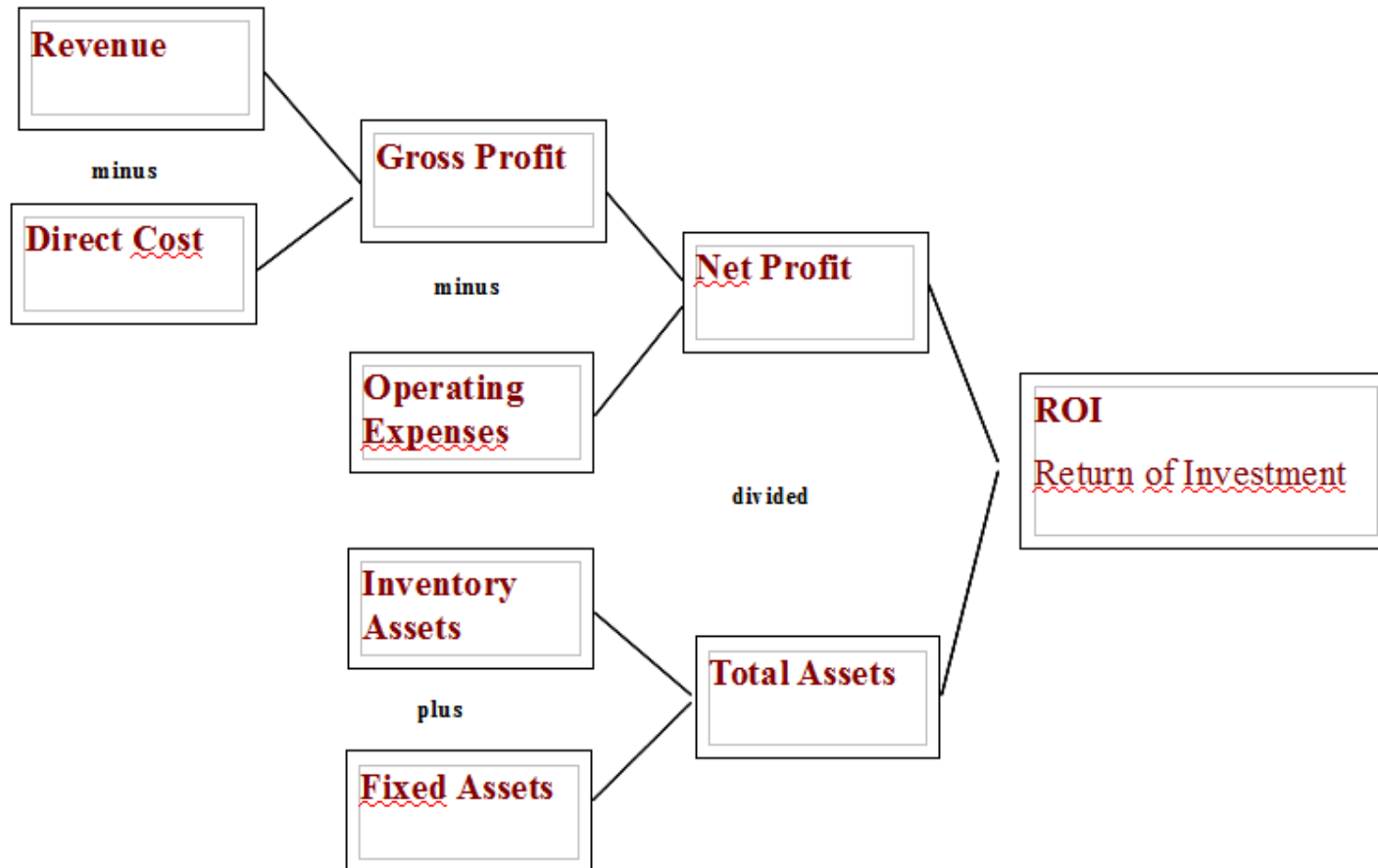
Use the resources 100%.
Fill up the gear box storage.
(Forget about "Lean thinking"!)



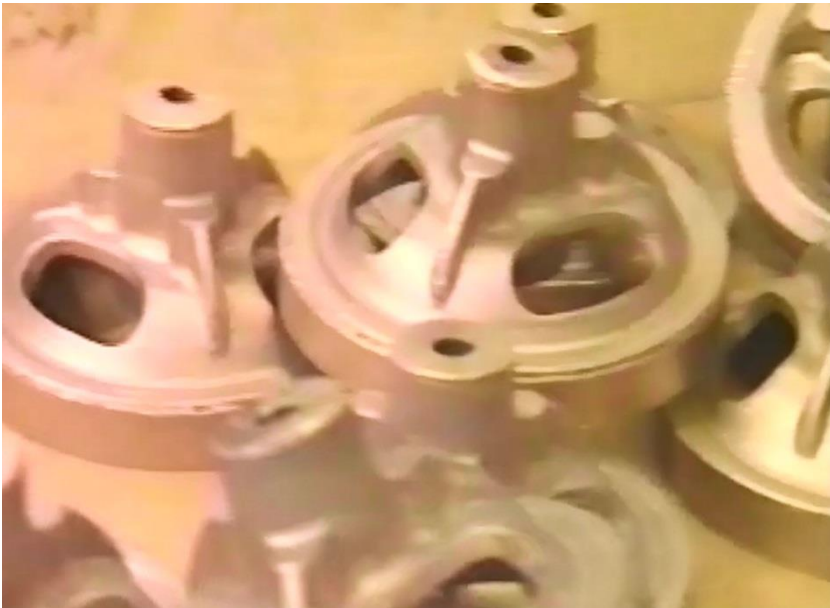
Production manager

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Economy



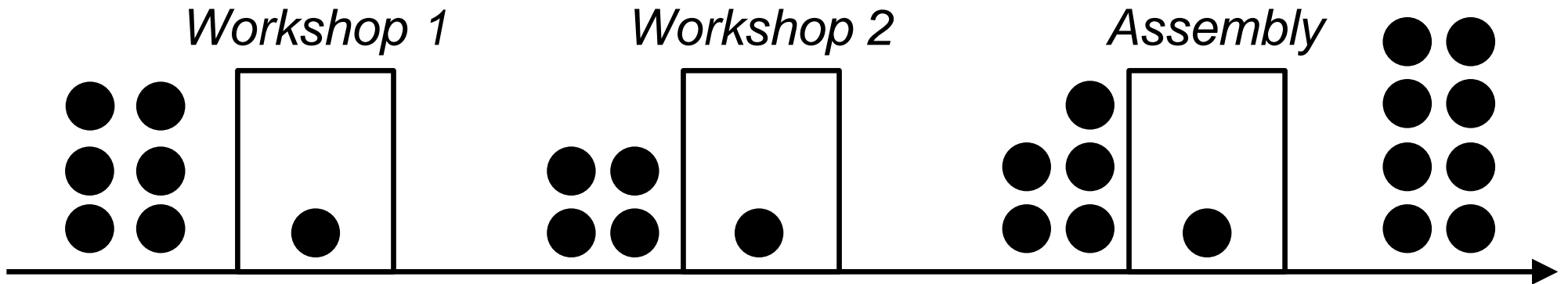
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Movie time

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Production flow



Store

Store

Store

Store

Your point of influence:

→ Order point (OP)

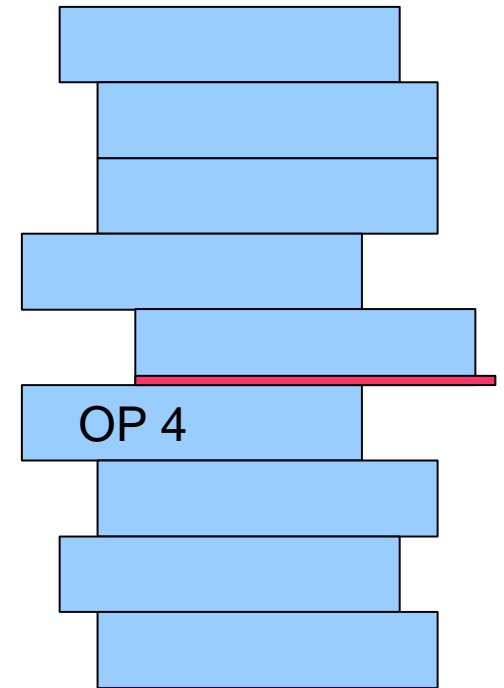
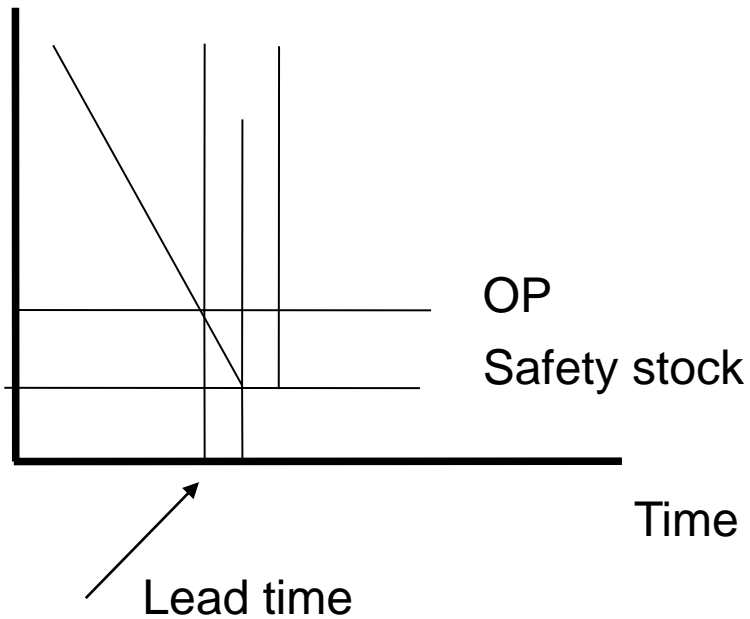
→ Economic order quantity (EOQ)

Order point

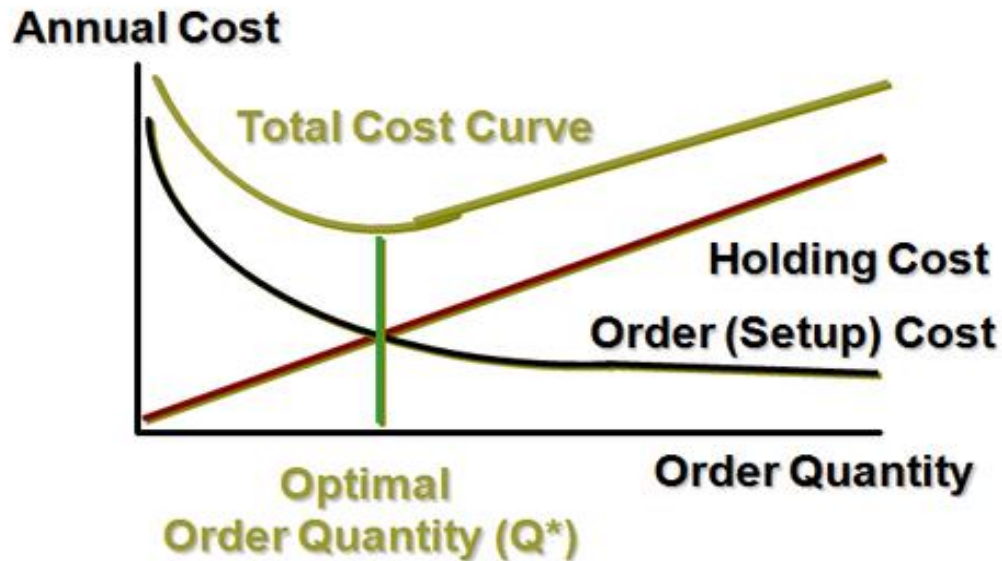


Order point is the level of inventory when an order should be made with suppliers to bring the inventory up (by the economic order quantity).

Quantity



Economic Order Quantity



Economic order quantity is the order quantity that minimizes total inventory holding costs and ordering costs.

$$Q = \sqrt{\frac{2K\lambda}{h}}$$

Q: Economic Order Quantity
K: Demand quantity
 λ : Shipping cost
h: Holding cost

$$Q^* = \sqrt{\frac{2DS}{H}}$$

A typical game situation...

Store:



<u>Part A:</u> OP: 2 EOQ: 3
<u>Part E:</u> OP: 3 EOQ: 2
<u>Part I:</u> OP: 3 EOQ: 2

You can change OPs after round 2, discuss it in your group!

You cannot (!) change EOQs, but you can order multiples of EOQs, discuss it in your group!

Workshop 2 is your "bottleneck"



→ *max. 4 tubes!*

→ *EOQs cannot be separated!*

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Game 1:


Make to stock

Production Controlled by OP (Order point)



Increasing ROI...

Owner



Use the resources 100%
Assembly, fill up the gear box storage
(Forget about "Lean thinking")

Production manager

Initial game setup (round 1)

Manufacturing planning (Detaljplaneringen):

Orders: 2 E (2 empty tubes)

Workshop 2 (Funktionell verkstad 2):

Gear I: 2 (2 tubes, 3M in each)

Component store 1 (Komponentförråd 1):

Gear A: 5 (5 tubes, 3M in each)
Gear E: 2 (2 tubes, 3M in each)
Gear I: 4 (4 tubes, 3M in each)

Component storage 2 (Komponentförråd 2):

Shaft K: 8 (8M)
Shaft L: 8 (8M)

Raw materials store (Råmaterialförrådet):

Blanks: 7 (7M)

Workshop 1 (Funktionell verkstad 1):

Gear A: 3 (3 tubes, 2M in each)

Gearbox storage (Färdigvarulager):

Gearbox AK: 3 (3 tubes, 5M in each)
Gearbox AL: 2 (2 tubes, 5M in each)
Gearbox EK: 2 (2 tubes, 5M in each)
Gearbox EL: 1 (1 tubes, 5M in each)
Gearbox IK: 2 (2 tubes, 5M in each)
Gearbox IL: 2 (2 tubes, 5M in each)

Cash-department (Kassa):

40M

Customer (Kund):

160M (All Extra)

→ Add order points (post-its)

In your group appoint:

*Who is in charge of **raw material** inventory, **buffer 2** and **purchasing** activities*

*Who is in charge of **production**, **assembly**, **deliveries** and **payments***

*Who will ensure what you stick to your **plans***

*Who is responsible for the **cash**.*