Product mix and TOC

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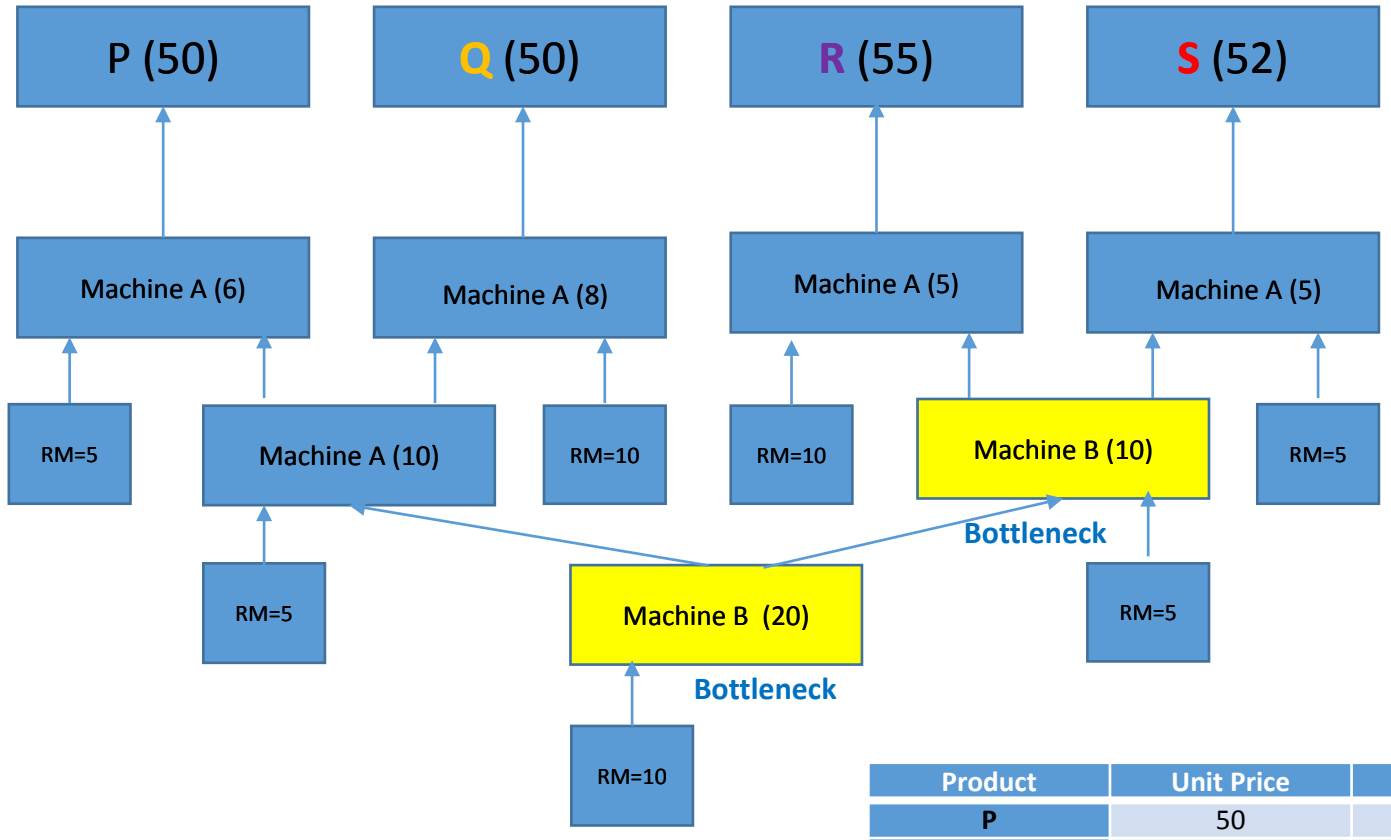

Task control parameters

8 hours /day=**480** min, Cost/hour/resource=**10** USD
To produce **P** or **Q** ->20 minutes of B (bottleneck)
To produce **R** or **S**->30 minutes of B (bottleneck)

Two workers are always needed
to produce each of the four products

Product	Unit Price	Material Cost	Work (min USD)	Profit
P	50	20	36 min (6 USD)	50-20-6=24
Q	50	25	38 min (6,33 USD)	50-25-6,33=18,67
R	55	25	35 min (5,83 USD)	55-25-5,83=24,17
S	52	20	35 min (5,83 USD)	52-20-5,83=26,17

Some calculations

Time in minutes calculated for all Machine centers :
P->6+10+20, Q->8+10+20,R->5+10+20, S->5+10+20

36 minutes -> 36/60=0,6->0,6*10 USD =6 USD (Cost of work)
38 minutes -> 38/60=0,63->0,63*10 USD= 6,33 USD (Cost of work)
Cost of work/minute in USD -> time includes both machines (A and B)

RM=Raw Material

Price =Selling Price or in Dynamics Business Central Unit Price

Based on Prof. James R. Holt, Washington State University

Four different approaches how to solve the product mix

highest profit

highest selling price

highest machine efficiency

highest use of bottleneck

Classic approach – highest profit (accountant) – **S product**

S (52)

Cost of material

- NP=T-OE=52*16 pcs - 20*16 pcs - 2 workers*8 hours*10 USD/hour = **352** USD/day
- Where 16= 480/30=16 = 480/(20+10)
- 20+ 10 is capacity of machine B (bottleneck) to produce **S**

Machine B (10)

Machine B (20)

Calculations for bottleneck B only !

Product+	Price	Material	Work (min USD)	Profit
P	50	20	36 min (6 USD)	50-20-6=24
Q	50	25	38 min (6,33 USD)	50-25-6,33=18,67
R	55	25	35 min (5,83 USD)	55-25-5,83=24,17
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This table is used only for classic approach to choose product with highest profit (S)

Cost of work/minute in USD calculation.

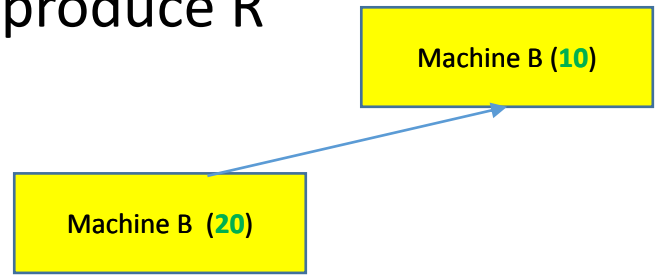
Calculated time of work includes both machines (A and B)

Marketing approach – highest selling price **R product**

R (55) ← Highest Selling Price

Cost of material

- NP=T-OE =55*16 pcs - 25*16 pcs - 2 workers*8 hours*10 USD/hour = **320** USD/day
- Where 16= 480/30=16 = 480/(20+10)
- 20+ 10 is capacity of machine **B** to produce R



Calculations for bottleneck B only
Focused on the highest selling price

Production approach – highest machine efficiency Q product

The idea is to produce as many products as possible

Q (50)

Cost of material

- NP=T-OE=50*24 pcs - 25*24 pcs - 2 workers*8 hours*10 USD/hour **= 440** USD/day
- Where 24= 480/ 20 (the quantity of the product)
- 20 is capacity of machine B to produce Q

Machine B (20)

Calculations for bottleneck B only
The intention is to produce as much as possible

TOC approach – highest use of bottleneck **P** product

P (50)

Cost of material

- NP=T-OE =50***24** pcs - 20*24 pcs - 2 workers*8 hours*10 USD/hour = **560** USD/day
- Where 24= 480/ 20
- 20 is capacity of machine B to produce **P** product

Machine B (20)

Calculations for bottleneck B only
The intention is highest use of bottleneck
Material costs are lower for product P than for product Q.

Results

• Accounting approach	S	$352	100%
• Sales-Higher Sales Price	R	$320	90%
• Production-Efficiency	Q	$440	125%
• **TOC approach**	**P**	**$560**	**159%**


WHO IS IT?
SLYANC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