WS ORK – TUDY

Munthof 11
NL-5551 XG Valkenswaard
The Netherlands
Tel. +31-40.2046048

WORK-FACTOR

Website www..work-factor.nl

De Work-Factor Raad wil een platform bieden aan Work-Factor gebruikers, arbeidsanalisten, cost engineers en industrial engineers om problemen, oplossingen, ideeën en tips te bespreken. Daartoe zullen we regelmatig een WS Tip sturen aan “WF-leden” en geïnteresseerden. Mocht dit bericht niet op het juiste adres aankomen stuur het dan door naar geïnteresseerden en laat ons dat weten, svp.

WS ORK – TUDY WS Tip 201 31 augustus 2021

Het onderwerp van vorige WS Tips staat op de WF Website onder: WF en Management/Praktisch - Algemeen/WS Tips.

A practical example of the Theory Of Constraints

THE P&Q PROBLEM, Part 7

We stay in Europe with original machines B and C.

Step 4: Elevate the constraints.

As we still have a market demand of Q larger than our production capacity, the decision has been made to buy an extra capacity “B”.

Investment of $ 100.000,-
Operational expenses will rise weekly with $ 400,-.

Question 6: What is the pay-out time of this investment in weeks?

Stop here and calculate, then continue to find out.

SOLUTION QUESTION 6:

Pay-out time:

Product	**P**		**Q**
Sales in units	$ 100		$ 50
Selling price	$ 90		$ 100
Raw materials	$ 45		$ 40
Added value/unit	$ 45		$ 60
Total added value	$ 4500		$ 3000

	$ 7.500,-
Operational expenses	$ 6.400,-
Result (new)	$ 1.100,-
Old result	$ 300,-
Extra profit	$ 800,- / week

Pay-out time: $ 100.000,- / $ 800,- = 125 weeks.

Question 7: Now the market in Japan is still open for our products.
Shall we also sell in Japan?
What is the profit?
What is the pay-out time now?

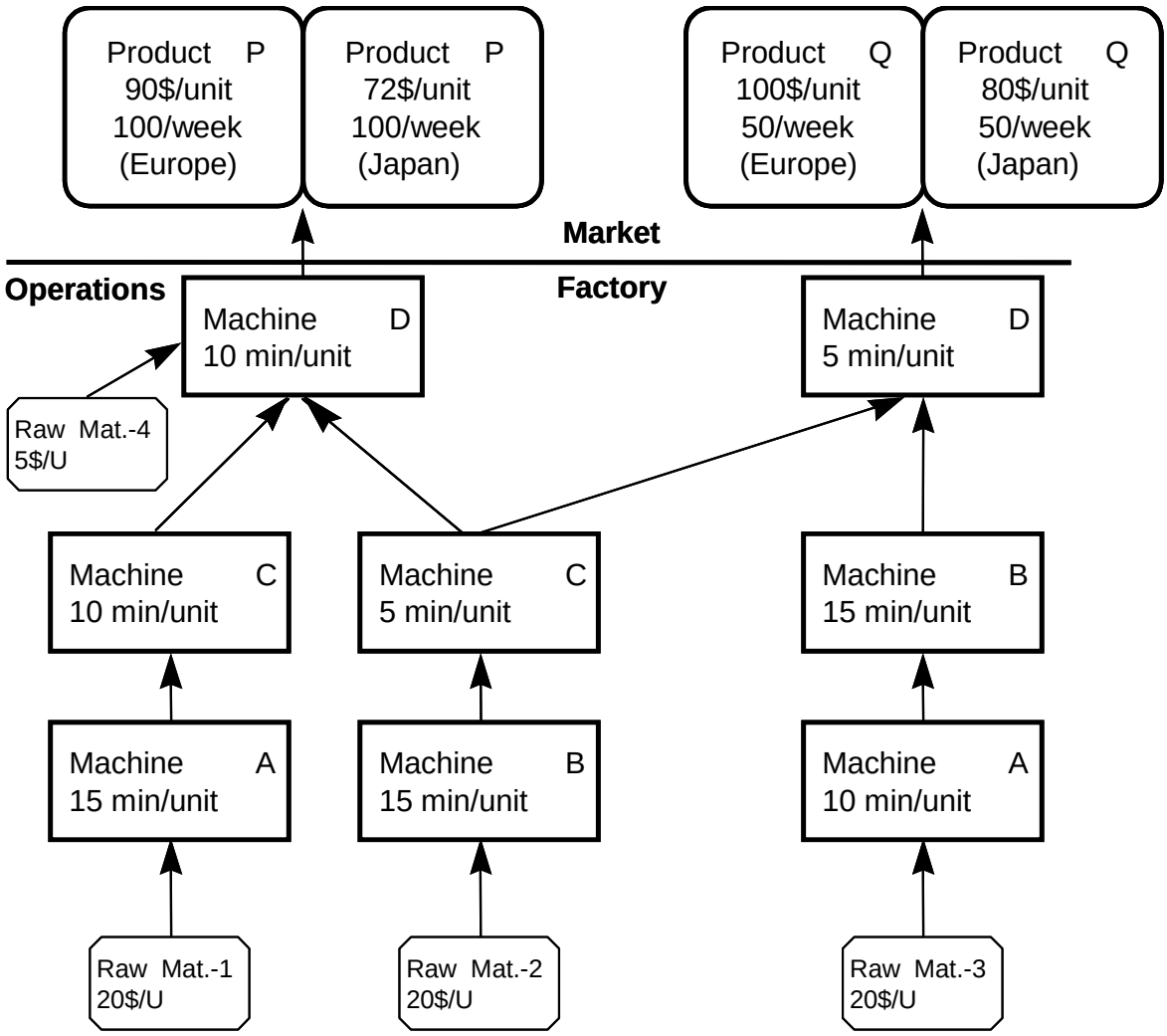
We will have the following situation.

THEORY OF CONSTRAINTS (example)

Question 7

a) Most profitable market mix ?

b) Pay-out time of the second machine B?



Day shift, 8 hours per day, 5 days per week

"Operating expenses": $ 6000,- + $ 400,-) / week

Available: 1 machine A
2 machine B
1 machine C
1 machine D

NB

Investment 2nd machine B: $ 100.000,-.

Stop here and calculate, then continue to find out.

SOLUTION QUESTION 7:

a)
The factory has decided to buy a second machine B. This raises the available capacity to: 2 x 2400 = 4800 min. B.
Investment 2nd machine B = $ 100.000,-.
Extra operating expenses (worker at machine B): $ 400,- / week.
This is step 4 in the TOC:

Step 5: If a constraint is broken, go back to step 1

Calculation of the machine loading capacity for the total possible market demand of 2 x 100 P and 2 x 50 Q:

Machines	Required	Available	Capacities
Mach. A	4000 min.	2400 min.	Capacity constraint (166%)
Mach. B x 2	6000 min.	4800 min.	Capacity constraint (125%)
Mach. C	3500 min.	2400 min.	Capacity constraint (146%)
Mach. D	2500 min.	2400 min.	Capacity constraint (104%)

Now the primary constraint is machine A.
(It is assumed that the constraints are independent)

	P-Europe	Q-Europe	P-Japan	Q-Japan
Selling price Materials Gr. Margin	($90,-) – ($45,-) = $ 45,-/unit	($100,-) – ($40,-) = $ 60,-/unit	($72,-) – ($45,-) = $ 27,-/unit	($80,-) – ($40,-) = $ 40,-/unit
Min. A:	15 min./unit	10 min./unit	15 min./unit	10 min./unit
Margin per min. A:	45/15= $ 3,00	60/10 = $ 6,00	27/15= $ 1,80	40/10= $ 4,00
Schedule	3	1	4	2

So the schedule will be: Q_E, Q_J, P_E, P_J.

So, according to the schedule:

Begin with	Q-Europe	50 x $ 60,-=	$ 3.000,-	(500 min. mach. A),
then	Q-Japan	50 x $ 40,-=	$ 2.000,-	(500 min. mach. A), and
fill up with	P-Europe	93 x $ 45,-=	$ 4.185,-	(1400 min. mach. A)
			$ 9.185,-	
		-/- OE	$ 6.400,-	
		+	$ 2.785,-	(profit).

b)
Extra profit: ($ 2.785,-) – ($ 300,-) = $ 2.485,-
Pay-out time: ($ 100.000,-) / ($ 2.485,-) = 40 weeks.

Dus:
Sturen op de Bottleneck,
de rest is ondergeschikt aan de BN.

Generieke aanpak, de 5 hoofdstappen:

Stap 1. **Identificeer de “bottleneck”**
Identify your constraints
Stap 2. **Exploiteer de bottleneck (haal het maximum eruit)**
Exploit your constraints
Stap 3. **Maak alles ondergeschikt aan die beslissing(en)**
Subordinate everything to the decision you have taken.
Stap 4. **Hef de bottleneck situatie op**
Elevate the constraints.
Stap 5. **Pak het volgende knelpunt aan (dat je zojuist geschapen hebt!)**
If a constraint is broken, go back to step 1

NB. **If there is no BN in your factory (enough capacity available), than choose one capacity to be the BN, (probably the machine that will likely become a BN for some reason) because making and planning the schedule will be simpler.**

Voor reacties naar

G. de Vrij
Secr.: WORK-FACTOR Raad
Tel: +31.40.2046048
E-mail: work-study@onsmail.nl of info@work-factor.nl
Website: www.work-factor.nl

WORK-FACTOR